Clinical Lecture
ON A
CASE OF HYDROPERITONEUM.

Delivered at the Middlesex Hospital, March 4th, 1893,

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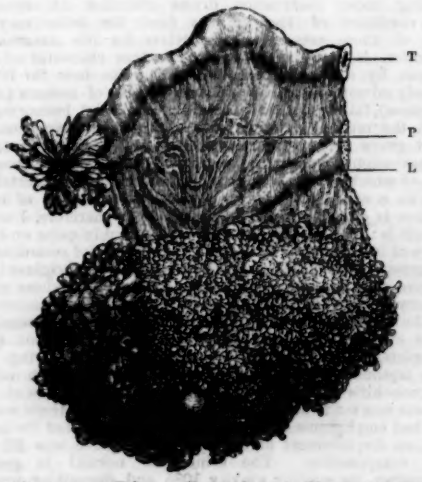
GENTLEMEN,—It is customary to refer to all collections of fluid in the peritoneal cavity under the term "ascites." Free fluid in the abdomen may arise from abnormal conditions connected with the circulation, such as heart or renal disease, and from obstruction to the portal circulation; to accumulations of fluid arising from such causes the term "ascites" should be restricted. When the fluid is secondary to disseminated nodules of cancer, ovarian sarcoma, peritoneal warts, adenoma of the Fallopian tubes, or to salpingitis, the collection of fluid should be referred to as "hydroperitoneum." We have had recently, in the Helena Ward, a very instructive case in relation to this matter which induces me to bring the subject under your consideration. Many of you will remember that in January last Mr. Arthur Wyborn sent

FIG. 1.

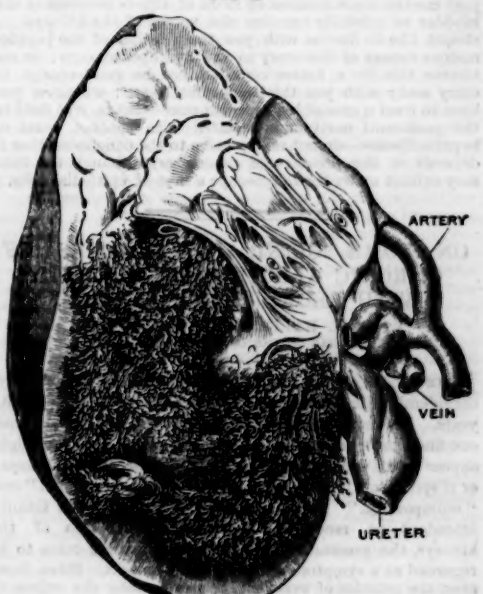


A warty ovary. T, Tube. P, Parovarium. L, Ligament of ovary.

me a female patient with a note to the effect that she was suffering from some serious ovarian or uterine disease. The patient stated that she was forty-one years of age, single, and had ceased to menstruate for five years. She had for many months suffered from constipation, and that difficulty had increased during the past six weeks. The patient looked ill. On examining the abdomen it was found to be distended below the umbilicus, and although I satisfied myself that there was free fluid in the peritoneal cavity I pointed out to you that the physical signs were not characteristic of ordinary ascites. On examining the pelvic organs the uterus was natural in size and position, but no tumour was detected through the vagina. On rectal examination a soft mass external to the bowel could be felt pressing upon and narrowing its lumen, but not invading its walls. The patient was advised to come into the hospital. On her admission seven days later the fluid in the abdomen had considerably increased in quantity, otherwise the physical signs remained the same. The urine was normal in quantity and free from albumen. The patient was examined by a medical colleague, who pronounced her free from cardiac or pulmonary trouble; there was no œdema of the extremities. I invited some of my surgical colleagues to examine the case, but they were unable to throw any fresh light on it and it was deemed advisable to recommend the patient to submit to an exploratory operation. To this she assented without the least hesitation.

The abdomen was opened on Feb. 4th, in the same manner as for ovariotomy, and a large quantity of fluid at once gushed out. On introducing my hand into the abdomen I found the left ovary replaced by a large soft, warty mass, the size of two closed fists. The tumour was carefully withdrawn through the incision, and its pedicle transfixed and tied with silk. I found the right ovary in a similar condition, but much smaller. (See Fig. 1.) This was removed. The abdomen was then flushed with warm water, and on examining the pelvic peritoneum it was found beset with a velvety mass of soft pink warts which bled freely when they were rubbed with the sponge. The uterus was small, but otherwise normal. The abdominal incision was closed with waxed silk sutures, the wound dressed, and the patient returned to bed. She made an uninterrupted recovery and left for a convalescent home three weeks after the operation. The tumours were typical examples of papillary cysts arising in that portion of the ovary known as the paroöphoron; the warts, as I have had several occasions of demonstrating to you, arise from the inner walls of the loculi and often grow so luxuriantly and lead to such distension that the walls rupture and

FIG 2.



A villous tumour (papilloma) of the kidney.

become everted, allowing the warty masses to project freely into the peritoneal cavity. In some of the loculi the warts perforate the cyst wall and project partly into the cavity of the cyst and partly into the peritoneum.

On microscopical examination these papillomatous masses will be found to conform to the structure of warts which occur in other situations, but the epithelium which surmounts them is very abundant and easily detached; this explains the abundance of cells found in the fluid which escaped from the abdomen. It frequently happens that surgeons are alarmed when they find warts on the peritoneum; they at once regard the case as one of malignant disease; but, as I have told you on other occasions, there is no ground for alarm, as the warts will quickly disappear after the primary tumours have been removed. In this respect these warts are in agreement with what we know of crops of warts on the skin. They often occur suddenly and almost as suddenly disappear; indeed, the life of warts is often very transient. So with peritoneal warts; but as long as the seed supply continues new warts spring up, last for a time and then die, to be succeeded in their turn by a new crop. Remove the tumour, the supply of germ-epithelium ceases, the warts die and the crop is not

replenished. The explanation of the predilection of the warts for the recesses of the pelvic peritoneum is due to the fact that when the body is at rest the detached cells in the peritoneal fluid sink to the lowest level and thus naturally fall into the pelvis. The quantity of cells in the fluid free in the abdomen in these cases is very great; hence, had we removed a small quantity and examined it under the microscope, it would have led us to believe that this woman was suffering from a cancerous tumour; but my investigations have taught me to place very little reliance on the microscopical characters of fluid removed from the abdomen in cases of hydroperitoneum, and for some years I have disregarded this method as an aid in diagnosis.

Let me remind you that there are other situations where papillomata may give rise to secondary tumours. For instance, we have in the museum this rare specimen (see Fig. 2) of villous tumour (papilloma) of the pelvis of a kidney. The specimen was obtained by Dr. Murchison from a man sixty-five years of age; the opposite kidney was affected in a similar manner, but an interesting feature in the case was the existence around the vesical orifice of each ureter of a villous tumour of the same structure as those in the kidneys. It is not improbable, from what we know of the habits of warts generally, that in this instance the vesical warts were due to transplantation of epithelium from the pelvis of the kidney to the bladder. This case should teach us in conducting post-mortem examinations on cases of villous tumours of the bladder to carefully examine the pelves of the kidneys. I should like to discuss with you the relation of the papillomatous masses of the ovary to the hydroperitoneum: let me reserve this for a future occasion, but be good enough to carry away with you this important lesson: whenever you have to treat a case of hydroperitoneum—that is, free fluid in the peritoneal cavity unassociated with cardiac, renal or hepatic disease—do not rashly come to the conclusion that it depends on the presence of cancer, even though the fluid may exhibit under the microscope a host of epithelial cells.

ON SOME CLINICAL VARIETIES OF CHRONIC ALBUMINURIA, CHIEFLY WITH REGARD TO PROGNOSIS.[1]

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THE clinical significance of albuminuria has, undoubtedly, considerably diminished in importance during the last twenty years. Referring to text-books published about that time, one finds hardly any mention of the fact that albumen might appear in the urine independently of disease of the kidneys; or if spoken of, it was recorded as "highly exceptional" and "unimportant." Moreover, in consequence of the fatality attendant on recognised inflammatory diseases of the kidneys, the presence of albumen in the urine came to be regarded as a symptom of the gravest import. Since, however, the practice of systematically examining the urines of all patients for albumen, as well as those of a presumably healthy class, that present themselves for life assurance and for the public services, came into vogue a numerous and well-defined group of cases has been determined, which for convenience may be designated as "functional," and which perhaps constitutes from one-third to one-half of all the cases of albuminuria that come under observation. Besides which, with regard to the albuminuria associated with actual disease of the kidneys, the earlier recognition of the symptom, owing to the systematic examination of the urine—now, it is to be hoped, universally employed—points to the mischief in the primary stage of its inception before the structure of the kidney is irreparably damaged; and permits, by improved dietetic and hygienic measures, of checking its advance, and possibly in acute forms its recurrence. This has made the prognosis of albuminuria not only more hopeful, taken as a symptom generally, but even in the graver cases, when associated with renal disease, less immediately fatal than was till quite recently the case. It is in respect to this latter class of albuminuric subjects that I wish to invite discussion, and I venture to express the opinion that, when early recognised, and when the patient has been placed under proper supervision—dietetic, hygienic and therapeutic—those forms of chronic albuminuria collectively known by the term "Bright's disease" have a less dark prognostic future before them, but are even, for a time, susceptible of a very distinct amelioration. But in these cases (organic renal disease) there are such clinical varieties depending etiologically on the constitution of the individual—heredity; specific conditions, such as gout, syphilis, struma &c., either acquired or inherited; specific poisons, such as scarlet fever, diphtheria, lead poisoning and the like—which have to be taken into consideration in coming to a conclusion as to the course any given case has to run, that nearly every case presents itself as showing some variation worthy of notice, either as affecting the predisposing or exciting causes or influences, or conditions that accelerate or retard the advance of the disease. I now propose to submit a few of the most important of these clinical variations and their influence on the prognosis of the disease.

The most familiar varieties of chronic albuminuria which present themselves are those which eventuate in the small red and small white granular kidney. Though so frequently coming under observation, still, owing to the insidious nature of their onset, they are rarely observed in their earlier stages, and there is therefore comparatively little information regarding their evolution, and the possibilities of arresting or retarding their development. When they do come under observation the disease is usually far advanced, some decidedly unfavourable symptom having drawn attention to it. Taking the cases associated with small red kidney first into consideration, and excluding hospital patients in whom the systematic examination of the urine when first coming under observation draws attention at once to the condition of the kidneys (and the same may be said of those presenting themselves for life assurance), attention is usually drawn to the true character of the disease by some symptom which denotes how far it has already advanced—as, for instance, attacks of asthma (renal dyspnœa), failure of sight (albuminuric retinitis), hæmorrhages from the mucous surfaces, and paralysis, all symptoms of most grave prognostic import, denoting advanced arterial degeneration and deterioration of the blood; after the recognition of which hopes of prolonging life are seriously curtailed, and as a consequence the prognosis of this form of renal disease is deeply gloomy. One question, therefore, I would submit is: supposing the disease is detected in quite an early stage of its inception, is there any possibility of retarding its progress and rendering the prognosis somewhat brighter? As I have said, one so rarely meets with a case whose whole history is known that such a question can only be answered by the collective experience of many observers. Personally I have observed only one case, and even that not quite completely, for, happily, the patient is still living. In this instance I originally saw the patient for an attack of bronchitis in 1878, when he was fifty-five years of age. A note was made at that time to the effect that there was no marked emphysema of the lungs, no enlargement of the heart, and no displacement of the apex. The pulse was 88, full and compressible. The urine was normal in general character, its specific gravity 1025 and depositing urates; there was no albumen or sugar detected. This patient again came under observation in 1882, complaining of headache, insomnia and palpitation of the heart. Physical examination showed hypertrophy of the left ventricle and displacement of the apex towards the nipple line; the pulse exhibited some degree of tension. The urine was abundant, its specific gravity 1014, and it exhibited a trace of albumen. The patient was placed on a non-stimulating diet, chiefly milk, fish, farinaceous food and white meats, whilst red meats, wine and coffee were forbidden. He went to Homburg that summer with the result for a time that the albumen disappeared. He has now been under observation for eleven years, with the result that, with the exception of a slight outward displacement of the apex of the heart to outside the nipple line, of a more palpable thickening of the radial vessels, of the more constant passage of albumen, and of a urine of low specific gravity, he has not altered much for the worse during that period. He has adhered steadily to the diet prescribed for him from the first, and certainly up to the present time has not developed any serious symptoms of the disease, though of course it is impossible to say how long his vessels may resist the tension in them or how far they have escaped degenerative changes, and his life may yet be prolonged. Still such a case is instructive, in that under moderate dietetic restrictions the disease

[1] A paper read before the Medical Society of London on Feb. 20th, 1893.

has not made further advances during the eleven years it has been recognised. When one reflects that this form of chronic renal disease is markedly hereditary it is possible, by keeping a watch for any manifestations of renal disease or antecedent cardio-vascular trouble and by placing the patient under proper dietetic control, to greatly hinder the advent of those symptoms which one is unable to combat successfully when once they have made their appearance.

With regard to the form of chronic albuminuria associated with the pale or mottled granular kidney, owing probably to the symptoms being detected earlier, the immediate prognosis is not so grave as in the preceding instance. Here the prognosis of any given case depends greatly on the nature of the predisposing and exciting conditions. Thus in the chronic nephritis of gouty patients the intensity and continuance of the inflammation are influenced by the frequency and severity of the gouty manifestations. These cases run often quite a chronic course, and when patients can avail themselves of the dietetic and hygienic regulations now advocated they have been known to live many years. Thus a patient who was seen by the late Dr. Murchison as long since as 1874, for nephritis associated with gout, is still living. He has wintered ever since in some dry warm climate, and has adhered to a non-stimulating and comparatively non-nitrogenous diet, and though the albuminuria has persisted throughout, he enjoys a fair measure of health, and as yet has developed no symptoms of uræmia or dropsy. Even when these symptoms manifest themselves they are not of so grave import as their occurrence in some other forms of chronic albuminuria would lead one to expect, and the patients often experience relief from them on the outbreak of a frank attack of gout. In one case, a patient aged forty years, who for three years previously had suffered from albuminuria, was seized with deep coma preceded by convulsions, whilst he also had considerable œdema and almost complete suppression of urine. The case was regarded as almost hopeless, but after many hours the coma passed off, and shortly afterwards an attack of frank gout developed. He lived five years, continuing his work nearly the whole time, and had he taken care of himself, and his occupation been a less trying one, he would probably have lived even longer. In another case, a lady, the duration of life was seven years after the first attack of uræmia. In the nephritis occurring in patients who have suffered from syphilis or malaria, and especially those subject to lead poisoning, the prognosis is far less favourable, probably from the fact that degeneration of the vascular system occurs earlier. Indeed, it may be taken as a general statement that patients rarely survive more than from eighteen months to two years after the appearance of serious hæmorrhage, either from mucous surfaces or from the vessels of the retina. Mentioning the occurrence of hæmorrhage from degenerated vessels brings to my notice a comparatively rare form of nephritis, which is attended throughout with a hæmaturia more or less persistent. Of three cases recently under observation at the London Hospital, in two the hæmaturia was moderate but constant, in the third profuse. The first case had suffered from albuminuria for about a year, during which time the urine had been bloody, the amount of blood was never excessive, being mostly observed when deposited as a fine red line on standing. The albumen was not excessive, and after the patient had been kept at rest in bed and on a milk diet it became merely a trace. Still blood corpuscles were always to be found on microscopic examination, and on frequent occasions crystals of free uric acid. He suffered at the same time from eczema of the scalp. His general health was not impaired, and whatever the cause of the hæmorrhage it did not apparently proceed from vascular degeneration. The second case was that of a young woman aged twenty-three who was admitted to the London Hospital suffering from hæmaturia. This at first was supposed to be due to possible renal calculus, but a close observation negatived that supposition, and there was no doubt that she was suffering from chronic nephritis. She was nearly three months in hospital, and during the whole time very definite traces of blood were always found in the urine, whilst the amount of albumen was never great. In this case the deposit of uric-acid crystals in the urine was frequent, and her father was stated to have suffered from gout. In the third case, that of a man aged thirty-eight, who was under the care of a colleague, the hæmorrhage was profuse. The patient had suffered from acute attacks of gout since the age of eleven, and for some years past had suffered from hæmaturia, alternating with the gouty paroxysm. In this case, as in the others, there was no evidence of vascular degeneration, nor was the patient's health impaired to the extent usually found in chronic nephritis, and the disease, whatever its nature, was apparently running a comparatively mild course. The albuminuria became merely a trace whilst the patients were kept on a milk diet and at rest, and had it not been for the continued presence of blood in the urine little importance would have been attached to their condition. In another case of hæmorrhagic nephritis somewhat similar conditions were observed, only the attacks were paroxysmal, so that had it not been for the presence of actual blood in the urine it might have been taken for hæmoglobinuria. The patient's (himself a medical man) account of his attacks were briefly as follows: On the first occasion he had been feeling distinctly unwell three or four days before, with a vague feeling of malaise, biliousness, noises in the head and intense languor. Then came a distinct rigor; the urine became scanty and smoky in colour, exhibiting under the microscope numerous blood corpuscles mixed with numerous uric-acid and oxalate of lime crystals. This state of things would continue for some days and then the attack passed off, though blood corpuscles would readily reappear in the urine on any over-fatigue or indiscretion of diet. The quantity of albumen observed at any time was always comparatively a mere trace, and that not always observable in each sample of urine passed in the twenty-four hours. Before I saw him he had three such attacks and I saw him just after his last. His urine contained only a trace of albumen, but many blood corpuscles and crystals of uric acid and of oxalate of lime. I should state that during the paroxysms his pulse, which was usually soft, became hard and tense. A case somewhat like this, only the hæmorrhage was more profuse, I have seen from time to time during the last nine years. He was originally sent as supposed to be suffering from renal calculus, as he complained frequently of paroxysms resembling renal colic and profuse hæmaturia. That his trouble was not caused by stone was soon proved, since it was evident the paroxysm did not follow exertion; and also, as soon as the hæmaturia cleared up, albuminuria persisted in considerable amount, whilst the urine contained casts of recent and old origin. In this patient the paroxysms were preceded by the same feelings of malaise as in the other patient. Both cases improved greatly when placed on a non-stimulating diet and both had a prolonged rest, the first passing a winter in Egypt, the other living for some time in a mild and sheltered spot in Ireland. The first patient reports that since his return he has rarely experienced a paroxysm, and that only at long intervals and in very slight degree. The other states that he has had no paroxysmal attack since he has developed gout freely in his knees, wrists and smaller joints. It is interesting, in considering the nature of this hæmorrhagic nephritis, to bear in mind that the nephritis occurring in malarious subjects is especially distinguished by its hæmorrhagic character, caused, no doubt, by the intense congestion of the abdominal viscera. May one therefore not conjecture that the gouty poison may have a similar effect in cases where the hæmaturia is distinctly of a paroxysmal character, and that the kidney itself is the seat of a true gouty inflammation.

So far I have been considering chronic albuminuria as the result of a hyperæmia more or less active, and must now consider the albuminuria resulting from passive congestion. Of late years this has not received the attention it deserves, partly because attention has been more fixed on those chronic forms of nephritis associated with cardio-vascular changes and increased arterial tension, and partly because such cases are less numerous in hospital practice than amongst private patients. In its most complete form this albuminuria is met with as a result of valvular disease of the heart, causing what is termed "cyanotic induration of the kidney." So far as prognosis is concerned in cardiac disease, the appearance of albumen in the urine denotes nothing more than the increasing failure of the right side of the heart and stasis in the renal veins. But there are also other cases in which venous stasis undoubtedly plays a part in causing a chronic albuminuria independently of actual disease of the heart. These occur chiefly in middle-aged persons who, either from hereditary predisposition or too free indulgence in rich food and generous wines, have become obese, especially as regards the deposition of fat round the abdominal viscera. Such individuals are of a lax constitution and usually have a feeble circulation; as a consequence of which assimilation is very imperfectly performed, and they require to be well supported in order that

enough material may be assimilated by their imperfect organs to carry on the vital processes. These patients, owing to the laxity and feebleness of the muscular system, take little exercise, with the result that they become flabby and, especially the abdominal muscles, relaxed, so that the abdominal viscera are not supported and the whole abdomen tends to fall forwards. This condition, together with the little exercise taken, and the amount of food ingested, adds to the already existing abdominal plethora, and after a time these patients, who have originally sought advice for relief from some dyspeptic trouble, begin to pass albumen with their urine. At no time is this ever excessive, and can be easily kept in control by diet and hygienic measures and especially by the use of mild aperient waters. In none of the cases I have had under my observation have I noticed the development of active gout or hypertrophy of the heart or degeneration of vessels, nor are uræmic symptoms usually present. When these patients die—and they often attain old age—it is from an intercurrent attack of some acute disease. So long, however, as these patients are not exposed to any vicissitude, are well fed—for in this form of albuminuria a more liberal dietary is required—and are warmly clad, they live for many years without any apparent advance of their renal trouble. This form of chronic albuminuria is often associated with an equally mild form of diabetes, both running a course together for many years. In five cases in which I have watched the progress of this double disorder, in none did it seem to affect greatly the general health. All except one who is still living, and he is sixty-five years of age, lived till close on their seventieth year, whilst the average duration of the disease in these four cases was just over twelve years. It is not improbable that the albuminuria met with in morphia *habitués* is of this congestive character; at all events, I feel disposed to accept the views of Professor Huchard of Paris on this point, although the arguments on the other side as expressed by Dr. Haig are deserving of consideration.

The albuminuria associated with lardaceous degeneration of the kidneys usually runs a protracted course; so much so, that one often loses sight of the case before its termination. In four cases, however, which have come under observation whilst preparing materials for this paper—one, a medical man, had suffered from enlarged liver and spleen with albuminous urine for twelve years; the second, a medical officer in the army, had been invalided from the service fourteen years previously on account of the disease; another case was that of a woman in whom the disease seemed to have followed repeated and severe attacks of ague, contracted twenty years before when residing abroad; in a fourth case, also a woman, the albuminoid degeneration was complicated with visceral syphilis, but her illness dated back many years. In fact, the chronic albuminuria of lardaceous degeneration runs, as a rule, a protracted course unless it becomes complicated with nephritis, when the downward course is extremely rapid. This unfortunately was brought under my notice last year in the case of a member of our profession. He had suffered from albuminoid disease for twelve years till, when away for a holiday, he received a chill, and suffered subsequently from hæmaturia. From this time the character of his urine changed—it became less profuse and contained casts which had not been detected before. Up to this time he was engaged in the active duties of his profession, and felt little the worse for his chronic complaint; now he became frequently indisposed; the heart, which up to that period presented nothing abnormal, now enlarged rapidly and extensive arterial degeneration soon became evident. He usually experienced an attack of gout in the spring of each year, but none developed this year, and he died in the summer from an attack of cerebral hæmorrhage.

Lastly, with regard to the forms of albuminuria not associated with renal disease; they have but slight prognostic significance, and are mostly transient and intermittent. This is so, no doubt, during the earlier years of life, up to thirty or perhaps forty; but the occurrence, especially for the first time in middle adult life, of an intermittent albuminuria is often a danger signal indicating more serious mischief to follow. There may be no evidence of changes taking place in the kidneys, no enlargement of the heart; the albumen disappearing, especially after a course of Homburg or Carlsbad waters, but reappearing on the slightest provocation, till eventually undoubted evidence of contracted kidney is present. A physician consulted me in 1880 for an intermittent form of albuminuria that seemed to follow upon slight dyspeptic troubles, and which passed away when he paid attention to the bowels. His heart and vascular system were perfectly normal. During his sojourn in Europe he had consulted many physicians, who all encouraged him by speaking of it as "a functional albuminuria." He was then a hale, hearty man of about fifty, but within four years of that time the heart became enlarged, the albuminuria persistent and his vessels degenerated. Had, I think, more attention been paid to this premonitory albuminuria and a rigid non-stimulating diet insisted on, the onset of more serious symptoms might have been delayed.

Having thus briefly and very inadequately mentioned some of the chief varieties of chronic albuminuria, I hope I have indicated that the two chief factors which have an effect in brightening prognosis and adding to the duration of life in these affections are, firstly, the earlier stage at which the disease is detected owing to systematic examination of the urine of all patients who seek advice; and, secondly, the improved system of diet now insisted on. The profession is much indebted to Sir George Johnson's teaching and his advocacy of a non-stimulating diet in inflammatory affections of the kidney. This of late years has taken the form of the "milk-cure," feeding the patient absolutely on milk; or if not entirely possible, with the addition only of the slightest modicum of other food and that of a non-stimulating character. This so-called "milk diet" is now so generally adopted that it might be considered superfluous for me to draw attention to it in this paper. But, in spite of its general adoption, there have always been some doubts expressed as to whether its administration is equally useful in all cases, and even if it may not be deleterious in some. With a view to obtaining information on this point I have instituted for some time past a series of observations on the effect of milk diet on the different forms of renal albuminuria. These observations consisted in making an analysis of the patients' urine on admission into the hospital, and afterwards gradually putting them on a milk diet (from three to four pints a day). This was continued for four weeks, a weekly analysis of the urine being made with regard to the amount of urine passed and the amount of urea, albumen and total solids. At the end of these four weeks a mixed diet was gradually resumed and another analysis made. As a result, in five cases of acute or subacute nephritis with dropsy an increase of urinary water, of urea, and a diminution of albumen were observed, which, when the ordinary diet was resumed, showed a tendency to relapse. In two cases of albuminuria associated with cardiac complication a slighter improvement was manifested. With one well-marked case of albuminoid degeneration the milk diet was distinctly unfavourable, so that after a fortnight's trial it had to be discontinued and a more generous dietary adopted, with distinct benefit to the patient. In three well-marked instances of contracted kidney with marked vascular degeneration the milk diet was not at all well borne by the patients. In one case, on the second day of its trial the patient was seized with severe uræmic convulsions; and in the other two aggravation of already existing uræmic troubles became more pronounced on a persistence of an enforced milk diet; whilst in all three an improved condition was noticed when a more solid dietary was resumed.

From these observations amongst hospital patients and from the experience obtained from private patients I have come to the conclusion that the best results are obtained from the milk diet in cases of acute or subacute nephritis in which the diuretic action of the lactose in the milk increases the flow of urine and relieves the dropsy; whilst in cases where degenerative changes have taken place, with an already failing heart, it is better to give a more solid and more stimulating food than milk, care being taken at the same time that it is easily assimilable and not highly nitrogenous. To my own mind the employment of an exclusive milk diet in chronic nephritis is positively injurious after degenerative changes have manifested themselves, yet in the earlier or more acute stages of the disease it must form the basis of treatment, and if it cannot be persisted in should be employed either in a modified form or resorted to whenever an exacerbation occurs.

Queen Anne-street, W.

ON Saturday last a purse of gold was presented to Dr. Mackay by his friends on his leaving Hornby for Knaresborough, as a public testimonial of their appreciation of his services during the past five years.

SOME SURGICAL AFFECTIONS OF THE HAND.[1]

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THE cases on which the following remarks are founded form a group of considerable interest, some of them having received very little or no attention at the hands of surgical writers, though possessing, also, much importance. In order to prevent unnecessary repetition it may be stated that when operation was performed for any of the conditions described carbolic lotion (1 in 40) was used for the instruments and for cleansing the part before incision was made, and perchloride of mercury solutions and sal alembroth gauze dressings, with wool, for the wounds. In no case did any abnormal rise of temperature follow on operation, nor was there any complaint of pain. Esmarch's bandage was invariably employed to render the part bloodless during the course of the operation.

Dupuytren's contraction of palmar fascia.—A pianoforte player aged fifty-eight was admitted under my care on Oct. 29th of last year into the Royal Free Hospital for deformity of the hands. There was no history of gout or rheumatism, or of a similar condition in any other member of the family. With the exception of an attack of bronchitis ten years ago he had always been healthy. He used to tune pianofortes, and at one time, up to about fifteen years ago, was accustomed to use a tuning key, which he had to press into the palm of the right hand; there was no history of pressure on the palm of the left hand. Fifteen months before admission the patient noticed that the little finger of the left hand was slightly flexed, whilst there were also slight rigidity of the ring finger and several thickenings in the palm. This condition had gradually become worse. The middle finger of the same hand and the little finger of the right hand had only been affected during the last two or three months.

On admission, three fingers of the left hand were affected. The metacarpo-phalangeal joint of the little finger was freely movable, but the first phalangeal joint was flexed to little more than a right angle and had only very limited movement. There was a hard thickening of the fascia opposite the first internode and another opposite the first phalangeal joint. A thick band extended from the centre of the palm to the ring finger, which was slightly flexed at the metacarpo-phalangeal joint; this could be extended when the first inter-phalangeal joint was flexed. There were two hard nodules opposite the first internode. The middle finger was only slightly affected, a thin band extending from the palm to the ulnar side of the base of the second phalanx. The right hand was not nearly so much affected. There was a hard lump on the ulnar side of the palm and a tight band stretching to the little finger, the metacarpo-phalangeal joint of which was slightly flexed. Opposite that joint was another thickened lump. A narrow band extended from the palm to the middle finger, the movement of which was not affected, and in the palm there was a thickening in the part of the fascia corresponding to that finger. Fig. 1. shows well the puckerings, thinning, and adhesions of the skin to affected fascia, also the large nodular thickenings of the affected fascia of the left hand; it is taken from a cast of the hand. Ten days after admission he was placed under the influence of ether and after careful preparation of the hands operation was performed after the method known as multiple subcutaneous puncture (Adams). The left hand was first treated, three punctures were required in the palm at different spots to free the ring finger, and one opposite the first internode of the little finger, which at once allowed of its complete extension. Another was made through the thick band which passed along the ulnar side of the middle finger. In the right hand two punctures were made, one a little above the metacarpo-phalangeal joint of the little finger, another opposite the same joint of the middle finger. The fingers of both hands were now freely movable, and could be completely extended. Splints were applied on the dorsal aspect of both hands. He had some pain, described as aching, in the hands, on the night following the operation, but no sickness from the anæsthetic. A note was made on Nov. 7th: "The dressings were taken off to-day and the punctures were found to be healed. The patient can extend all the fingers fully and plays the piano easily." I may say here that he then informed me for the first time that he had not been able to stretch an octave for more than eight years, and evidently enjoyed the increased freedom given to his movements. He was told to wear a splint at night for some months to come. The fibrous nodules which were so marked in this case had considerably diminished in size when he left the hospital on Nov. 16th, and their complete absorption is apparently only a question of time.

There are many points of interest in this case to which I should like to draw attention. The patient was an exceptionally healthy man for his years, without family history of gout or rheumatism or anything in the nature of disease which might be considered predisposing to the affection from which he suffered. As he had been a pianoforte tuner for a long time, the question suggested itself as to whether his occupation might not have produced the necessary change in the hands, frequent use of the tuning key being in his case the exciting cause of the contraction of the fascia. It was found, however, that the disease commenced in the left hand and was most marked there, whilst the right was the hand which he always employed in tuning. My colleague, Mr. Anderson, in his Hunterian Lectures, remarked that his investigations negatived the view that mere friction and pressure of the palm by tools or other objects habitually held within the hands can account for the disease. With regard to constitutional condition as influencing the occurrence of the deformity various investigators have given different opinions, some saying that gout is the cause (Dr. Keen gives forty-two out of forty-eight cases as gouty;

FIG. 1.

Mr. Adams calls it gouty thickening of fascia), others say it is of neuropathic origin, whilst rheumatism, rheumatoid arthritis and alcoholism have been cited with authority as the diseases on which its formation is dependent. The case of this patient would lend support to the opinion that, although a history of these various conditions may be present, the deformity is not dependent upon them; yet one would not attempt to deny that, granted the introduction of some cause for inflammation of the part, such constitutional states would render the process thus started of a more persistent and intractable character. I will again quote the excellent lectures of Mr. Anderson. He writes: "The situation of the initial lesions and the peculiar tendency of the new growth to feed, like a parasite upon the tissues in which it spreads and which it replaces, have led me to believe strongly that the active agent of destruction is a specific micro-organism, which gains access to the subcutaneous tissues through accidental lesions of the epidermis, mostly effected by the finger-nails. This would explain far better than any existing hypothesis the persistent causes of the disease and its proneness to recur after the most skilfully devised operation. The almost constant limitation of the disease to the declining years of life corresponds mainly to lessened resistance in the bodily organism, and partly perhaps to senile absorption of the palmar fat cushion. The almost complete immunity of the foot is accounted for by the protection afforded by the shoes and stockings and the impossibility of contact of the toe-nails with the sole. Individual and inherited susceptibilities are exemplified here, as in other complaints of known bacterial origin. Lastly, the absence of the affection in certain countries may be due either to the absence of the specific organisms or to antagonistic influences

[1] Abstract of a paper read before the South London Branch of the Metropolitan Counties Branch of the British Medical Association.

developed in the constitution by racial, climatic, dietetic and other conditions." The examinations of the affected fascia have not, so far as I am aware, yielded any definite result, but they have not proved that this view is *not* the correct one. They are being continued, and it is very likely may ultimately enable us to say that the specific form of Dupuytren's contraction is due to the entrance and slow development of a definite form of bacillus. The disturbance or inconvenience caused to the patient by the operation was so very slight and the result in increased movement of hands and fingers so immediate and great, that there need be no surprise at the gratitude of the man for what is to him an almost marvellous result. I do not consider that the operation has cured the patient; it has for a time, but he has been fully impressed with the necessity of continuing treatment by means of splints for many months. Taking the view that I do of the possible origin of the deformity and his good previous and family history, I have not told him to alter his ordinary routine of life or take any medicine to combat gout or rheumatism. I would draw attention to the condition of the fascial nodules so marked in the casts.

Trophic changes due to the pressure of a cicatrix in the palm.—Wounds of the palm of the hand involving injury of important nerves are not infrequent. The case to which I now draw attention simulated wound of the median nerve in the palm very closely, and the hand exhibited trophic changes commonly seen after the normal innervation of a part has been seriously interfered with. A watchmaker aged forty-eight came under my care on Jan. 20th, 1890, complaining of numbness and tingling in the fingers and thumb of the right hand. Four months before he had broken a thin glass vase by striking it against a clock with the palm of the right hand. There was considerable hæmorrhage, and one piece of glass was removed from the palm of the hand at the time. The wound healed readily. There was then no impairment of sensation or motion. A month later he was pushing some furniture when the scar gave way and bled; a small piece of glass protruded and was extracted by the man himself. A month after that he found the hand getting stiff, and he began to have numbness and pins-and-needles in it, and this had been steadily increasing since, so that the man had not been able to follow his occupation. Examination of the right hand showed some swelling of the fingers evenly distributed; the skin looked more shiny than on the other hand and the furrows were a good deal smoothed out. Over the distal phalanx of the first finger there was a good deal of swelling, and on the anterior surface were three sores, the two lower being covered with dried secretion; from the upper one serous fluid exuded on pressure over the top of the finger, where there was a largish blister. The skin of this upper part of the first finger was discoloured and bluish. The thenar eminence was wasted. The patient complained of numbness and occasional pins-and-needles in all the fingers and in the palm for about an inch, the more proximal part being normal and the transition from the normal to the abnormal area being gradual. Only the front and tip of the last joint of the first finger were absolutely insensitive. There was a small scar between the thenar and hypothenar eminences an inch below the wrist; immediately below this scar there was a slight prominence, and when this was pressed, especially if pressure was directed outwards, the patient complained of tingling in the fingers and pricking at the point of pressure. Four days after admission an incision about two inches and a half long was made over this scar in the line of the median nerve, commencing about half an inch above the wrist and continued into the palm. A good deal of very dense cicatricial tissue was met with at the lower border of the annular ligament, but no glass or other foreign body was found. The annular ligament was divided, and the median nerve, especially the palmar enlargement and the branches from it, carefully examined. It appeared quite normal; it was considered, however, that the palmar enlargement was more flattened than it should have been, and as the most dense part of the cicatrix corresponded in position with it a piece of the scar tissue was removed from each side of the incision. About six fine silk ligatures were required for small vessels. The annular ligament was united by four deep silkworm-gut sutures and the superficial part of the wound by interrupted silk sutures, in the usual manner. No drainage-tube was used. The wrist was semiflexed and placed in an anterior splint.

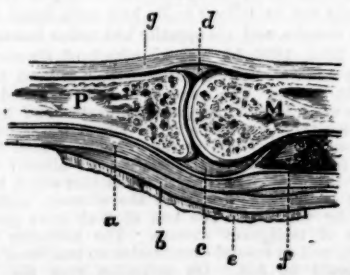
Eight days after the operation a slough was found at the end of the index-finger. The wound healed by first intention, and when the man left hospital on Feb. 8th the sores on the index-finger were nearly healed. He presented himself once at a later date; the skin was then recovering sensation in the parts previously numb; the sores had quite healed and the colour of the first finger was becoming the same as that of the others. There can be little doubt that the trophic changes in the hand were due to compression of the median nerve by the cicatrix which followed the wound of the palm. The gradual onset and steady increase in severity of the changes until, and for a time after, the operation point to this conclusion, which is further confirmed by the result of the operation.

Myeloma of tendon sheath.—This case is one of tumour of a tendon sheath. Apparently simple in character, it presented a structure after removal and examination under the microscope which proved it to be of unusual composition. The patient was a female servant aged seventeen, who was admitted into the Royal Free Hospital under my care on Nov. 12th, 1892, complaining of a swelling of the first finger of the right hand. There was nothing of importance in the family or previous history of this patient; she had noticed a swelling in the situation of the tumour for the past five years and it had gradually increased to its present size. It had not caused her any pain, but was inconvenient as it interfered with the use of the hand. On the flexor surface of the first phalanx of the index-finger of the right hand was a tumour about the size of a chestnut, not very hard, but firm in consistence and containing two hard nodules. Somewhat oval in outline, it extended from the first inter-phalangeal joint to the palm, and bulged equally to the sides. The tendon was quite free and the finger movable. The tumour could be moved from side to side, but not in the long axis of the finger. It did not appear to grow from the bone and was not at all sensitive. It was considered to be a soft fibroma having its origin in the tendon sheath. On the 14th it was removed through a longitudinal incision along its flexor surface. The superficial part was easily separated, being encapsuled, but it was more difficult to get the growth away below. It had, as was rightly supposed, its origin in the tendon sheath, some of which had disappeared in the tumour, whilst in another part dense bands from the sheath passed into it and assisted in holding it down. A prolongation of the tumour extended round the tendon and completely encircled it. The tumour was also adherent to the fibrous tissue of the sheath on each side of the tendon, and these attachments had to be cut away, there being nothing to mark the point at which the tumour ceased. After its removal about half the tendon lying over the first phalanx was exposed in the wound. Only one or two small vessels required to be ligatured, and the wound, which was closed with silk sutures, healed by first intention. The finger for a fortnight was swollen at the seat of operation on account of some effusion of blood into the wound, but movement has been permitted, which does not cause pain, and she can fully flex and use her finger, the only sign of anything abnormal about it being the presence of some thickening and a linear scar. The tumour is a lobulated soft growth in the greater part, but presenting two or three areas of yellowish change, and of harder consistence, resembling cicatricial tissue. The prolongation which encircled the tendon is of softer growth and more vascular and can still be seen to form a tunnel with the main growth, through which the tendon passed. Examination under the microscope shows the tumour to consist mainly of fibrous tissue, but scattered through the section are a number of well-marked myeloid cells. Tumours containing myeloid cells such as that described here are very rare, if one may trust the published reports of microscopical examinations, and it is very interesting to find that such cells may be found in growths which have no connexion with bone or periosteum. Fibrous tumours of the tendon sheaths, from which these cannot be distinguished clinically, have frequently been brought before the Pathological and other societies, but I can only find an account of one myeloma in English literature. In a paper by Mr. Makins on Some Intra-bursal Growths, read before the Pathological Society in November, 1886, he refers to a specimen which he removed from the tendon of the middle finger of a girl of twenty. It was of three years' growth, not painful when pressed upon, and on removal looked like a typical hard fibroma. It reached to the posterior aspect of the sheath and was removed without baring the tendon. On section he found scattered myeloid cells. More recently M. Heurtaux, in an account of these myelomata, has given five cases, three of which had been under his care. They presented characters similar to those met with in the patient

under notice, were lobulated, mostly soft, grew from the sheaths of the flexor tendons in young people, were all situated on the right hand, increased but slowly in size, and do not appear to have recurred after removal. They are evidently innocent growths, to be distinguished from the sarcomata.

Backward dislocation of the finger on the metacarpus.—Having recently had under treatment a case of complicated dislocation of the forefinger, I would draw attention to it, for although such cases are apparently rare I am not sure that they do not occur more frequently than is supposed and that the patient has to be satisfied with a crippled hand in consequence of a want of appreciation on the part of the medical attendant of the reason why these dislocations are sometimes not reducible by ordinary means. This is not surprising, for the text-books are quite silent on the subject. There will be found a long description of the dislocations of the thumb and the way in which it is recommended that they should be reduced, also an account of the supposed pathology of the injury, but most commonly the real cause of the difficulty in reduction in such cases, the part played by the glenoid ligament, is not touched upon. The case was that of a girl aged eleven, who came to the out-patient department of St. Thomas's Hospital on Feb. 1st of this year with an unreduced dislocation of the left forefinger, the result of a fall five weeks before. She had been placed under chloroform soon afterwards, an attempt had been made to reduce it, and it was supposed at the time that the attempt had been successful. The hand was placed on a splint, but on the removal of the splint swelling of the joint was still present, with pain on

FIG. 2.



Section through metacarpo-phalangeal joint (after Henle). M, Head of metacarpal. P, First phalanx. *a*, Tendon of flexor profundus digitorum. *b*, Flexor sublimis digitorum. *c*, Glenoid ligament. *d*, Posterior ligament (absent according to Gray). *e*, Sheath. *f*, Interosseous ligament. *g*, Tendon of extensor communis digitorum.

attempted movement, and when she was seen in the out-patient department there was still a typical dislocation at the metacarpo-phalangeal joint. The finger was shortened, the phalanx forming a projection on the dorsum of the hand; the head of the metacarpal bone was prominent and easily felt in the palm; the parts were swollen, somewhat red and very tender. She was admitted into the hospital, and on the following day I attempted—the child being under chloroform—to reduce the displacement by manipulation, but could not do so. A strong sharp-pointed tenotome was then passed into the joint to the outer side of the tendon, under the phalanx to the middle of the dorsal surface of the metacarpal head, and being then withdrawn on the bone, the knife divided intervening structures to a point just above the neck of the metacarpal. On flexion of the finger a slight snap was heard, probably due to the giving way of a small band of the glenoid ligament which had not been divided, and the dislocation was reduced. The hand was then placed on a splint.

I published a paper in THE LANCET of Dec. 22nd and 29th, 1888, on Backward Dislocation of the Fingers on the Metacarpus, and entered fully into the literature, pathology and treatment of these displacements. The conclusions to which I came were confirmatory of the investigations of some other surgeons. Mr. J. Adair Laurie appears to have first pointed out the *rôle* played by the anterior ligament in these dislocations in 1837, but his observation does not appear to have attracted much attention. More recently MM. Farabeuf, Palaillon, Jalaguier and others, including Dr. Otis, have published the results of further investigation and experiment, all confirming the opinion that the glenoid ligament of the joint is the cause of the difficulty in reduction. This glenoid (see Fig. 2) or anterior ligament, a very dense structure, occupies the interval between the lateral ligaments on the palmar aspect of each joint; it is a thick and dense fibro-cartilaginous structure, which is firmly united to the phalanx but loosely adherent to the metacarpal bone. It is continuous at each side with the lateral ligaments, so that the three form an undivided structure which covers the joint except on the dorsal aspect. Its palmar surface is grooved for the flexor tendon, whose sheath is connected to it on each side. The other surface, looking to the interior of the joint, is lined by synovial membrane and supports the head of the metacarpal bone. The weakest part of the ligament is the point of attachment to the metacarpal bone, and it is here that it ruptures when the finger is dislocated. These backward dislocations have been divided into three kinds: (1) simple incomplete dislocation, the phalanx not having completely left the head of the metacarpal; (2) simple complete dislocation, in which the phalanx has become displaced on the dorsum of the metacarpal bone and rests with its anterior edge on the neck of the metacarpal; (3) complex dislocation (see Fig. 3), in which the phalanx occupies a similar position, but the glenoid ligament with its sesamoid bone has become turned and is interposed between the bones, rendering the dislocation irreducible. The treatment which should be carried out in these dislocations is usually easy if the surgeon who first sees the case recognises the importance of the glenoid ligament and remembers its relationship to the phalanx. An attempt to reduce without chloroform by what

FIG. 3.

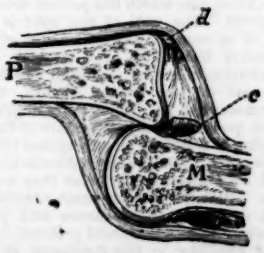


Diagram to illustrate position of misplaced glenoid ligament. Antero-posterior section. M, Metacarpal bone. P, Phalanx. *c*, Glenoid ligament. *d*, Ruptured dorsal ligament (occasionally present).

is known as the dorsi-flexion method should first be made; the phalanx is tilted up until it stands upon its articular end and both forefingers are placed so as to hold it in that position and at the same time press it against the distal extremity of the metacarpal bone. Under firm pressure with the thumbs against the base of the displaced phalanx it can generally be easily slid into position. It is a good plan to keep up extension on the finger and draw the base of it backwards on the dorsum of the metacarpal, so that the anterior edge of the phalanx may get well behind the ligament, to let it touch the metacarpal and afterwards press it forward. Should this not succeed, chloroform ought then to be given, and if manipulation again fail subcutaneous section of the ligament should be effected, as in this case. In old-standing dislocations the joint should be opened at the side and the adherent ligament separated with the point of a knife—a procedure which I have carried out with success. It is my opinion that the complicated cases of dislocation of the thumb are most frequently due to the separation, displacement and doubling up on the neck of the metacarpal bone of this glenoid ligament and that similar treatment is usually indicated. The presence in it of two sesamoid bones in the case of the thumb should be recollected if section of the ligament be required, the incision being made strictly in the middle line.

Flexor ganglion.—There is another condition to which I should like to draw attention, and that is a somewhat rare form of ganglion of the flexor tendons of the fingers—one which is peculiar in many ways and which (although I believe fully recognised) has not received that amount of attention at the hands of writers on surgical

subjects that it appears entitled to from the amount of annoyance and even actual distress to which it occasionally gives rise. A patient will sometimes come for relief on account of a painful place in the palm of the hand, and usually of the right one, perfectly well localised and much increased by attempts at grasping anything, such as the handle of a door, in order to open it. The pain will have existed for a variable time, and usually for a shorter period the patient will have noticed a swelling at the painful spot. On examination it is perhaps not easy at first to find any swelling, but if the finger be flexed and careful examination made where most tenderness is felt a rounded body will be found, not so large as a pea, well defined, very hard, and attached by a pedicle to the deeper parts just at the point where it is known that the sheath of the flexor tendon of the index-finger terminates in the palm. I say "sheath of the flexor tendon of the index-finger," for it will almost invariably be found in connexion with the sheath of this tendon and not with that of either the middle or ring finger, though it may possibly be there. This swelling is so exceedingly hard that the diagnosis, which is generally made by those who have not previously had their attention drawn to these ganglions, is that of fibroma or enchondroma of the hand. Enchondromata, however, are quite immovable and develop laterally, not towards the palm; besides, they are not painful or particularly tender, and are multiple, whilst these ganglions are, so far as my experience goes, invariably solitary. Situated in the palm of the hand at a point where nearly all bodies are touched when grasped, it is no wonder that much pain is produced by even ordinary use of the hand, so much so sometimes as to compel the patient to use it as little as possible. If these apparently solid bodies be cut down upon, they will be found to permit of easy separation from surrounding parts, excepting where the pedicle is attached, pear-shaped and cystic. The wall of the cyst is composed of fibrous tissue of a varying thickness and of considerable strength, contains fluid like that usually met with in ganglia, and communicates by means of the hollow pedicle with the interior of the tendon sheath, the lining of which is continuous with it. Why these ganglions sometimes develop it is not possible to say; the part of the sheath from which they spring is certainly much exposed to pressure, but these ganglions are rare and pressure alone is insufficient, even if violent and intermittent, otherwise they would be much more common. Perhaps there is some degenerative change in the sheath disposing to weakness and yielding under pressure, so permitting of a hernial protrusion. I have met with a similar swelling in the forefinger of a laundress, situated at the line marking the junction of the palm and the right index-finger on the flexor aspect. In this case there was no chance of verifying the diagnosis, for the woman, who was in bad health, refused to have anything done, although she complained of excessive pain and the hand was almost crippled; but it was probably of the same nature. In the case of these ganglions I do not think one can do better than cut down on them, separate them from surrounding parts and cut across the pedicle where attached to the sheath. An incision about an inch long in the line of the flexor tendon directly over the swelling, with retraction of the soft parts, usually gives ample room and enables the cyst to be removed without bruising or undue disturbance of the parts. In some cases doubtless a severe blow or strong pressure over the cyst will rupture it, but the immediate result is very painful and in those of any long duration unlikely to succeed. A curious instance of at least the temporary cure of a case came under my observation some years ago. A girl aged about sixteen was coming to have a cyst of this kind removed by operation, but when about to descend from a tramcar the horses suddenly started, and she, forgetting the painful hand, made a violent clutch at the rail of the car to save herself from falling, felt severe pain in the situation of the cyst, which caused her to scream out, and found that the swelling had disappeared. No trace of it could be felt by any of us when she showed the hand soon afterwards, and she has not come under observation again. Here the cyst was only of the duration of a month or two, and the walls very likely only consisted of thin membrane.

Whilst on the subject of these rarer kinds of cyst arising from the flexor sheaths, I will give short notes of a case in which two more like those seen about the wrist developed on the flexor surfaces of the index and middle fingers. The patient was sent for my opinion as to the advisability of submitting to amputation of the end of the right forefinger on account of a lump which had been painlessly growing in the pulp for a period of six months and which was still increasing in size. She thought that it had commenced in the skin, for it was movable at first, but lately it had become more fixed. There was a rounded, fluctuating swelling which caused a uniform enlargement beyond the line of the last inter-phalangeal joint, and was quite fixed, tense and fluctuating. This I considered to be a cyst, possibly connected with tendon sheath. Gas was administered and a lateral incision gave exit to glairy fluid; the cavity, lined by a glistening membrane, contained no growth and extended deeply to the periosteum. It was washed out with a carbolic solution and firmly wrapped with a strip of antiseptic gauze. Ten days later she told me that she thought there was another and a similar swelling in a corresponding position in the middle finger; this was so, and similar treatment, without anæsthetic, was carried out. Both these cysts were cured by this treatment.

Mansfield-street, W.

A CASE OF RUPTURE OF THE ŒSOPHAGUS.

BY BRIGADE-SURGEON-LIEUTENANT-COLONEL C. E. HARRISON, M.B. LOND., F.R.C.S. ENG., GRENADIER GUARDS.

A WAR OFFICE superintending clerk aged forty-seven came under my care on Jan. 3rd complaining that he had attacks of vomiting at intervals of three or four days, and eructation of fluid into his mouth. He had on previous occasions been under treatment for dyspeptic symptoms. The history was as follows:—He had been losing flesh for about six months, and his appetite had rather failed of late. On Dec. 20th, 1892, he had an attack of diarrhœa and, following this, the vomiting and eructation of fluid, for which he sought advice. The amount of fluid rejected on the occasions when he vomited was considerable and led to the opinion that there was some dilatation of the stomach, and possibly some obstruction to the passage of food from the stomach into the duodenum. The patient himself was conscious of this and described the sensation which he felt of the food gradually collecting in the stomach until it was rejected by vomiting. The loss of flesh gave ground for suspicion of malignant disease. The abdomen was not distended, and on careful examination no tumour or enlarged glands could be felt. On palpation over the stomach splashing sounds could at times be heard. He suffered no pain and had never vomited blood. A microscopic examination of the vomited matter revealed no blood or sarcinæ. The tongue was generally clean, or slightly furred after an attack of vomiting. The urine was natural, and the bowels acted regularly. The heart-sounds were clear and nothing of importance could be detected in the lungs. A mixture containing bicarbonate of potash, bismuth, nux vomica and gentian was ordered to be taken before meals. On the afternoon of Wednesday, Jan. 18th, he vomited whilst at his work, and the vomiting was repeated several times during the evening and night. On the following day (19th) an examination of the abdomen revealed nothing fresh, but he was directed to remain quiet in bed. About 3 P.M., having swallowed some milk arrowroot, the vomiting recurred, and whilst in the act of retching and vomiting he was seized with sudden and intense pain in the lower part of the left side of the chest. He remarked to his wife that he felt that something had burst in his stomach at the time the sudden pain occurred. This was followed by collapse of a marked character. Warmth was applied to the abdomen and lower part of the chest and he rallied somewhat. The pulse remained rapid and weak, and hurried respiration with some difficulty in breathing appeared. The tone of his voice was altered, being of a higher pitch than was natural to him. The temperature was subnormal. Towards midnight subcutaneous emphysema of the neck, cheeks and upper part of the chest developed. On examining the chest the area of cardiac dulness was observed to have disappeared, and this region and the upper part of the left lung were found to be hyper-resonant on percussion. Respiratory sounds were feeble, though present, over the left lung in front and exaggerated over the right lung. The possibility of a chronic gastric ulcer having led to a perforation of the diaphragm into the mediastinum suggested itself as an explanation of

the subcutaneous emphysema of the neck and face. A small hypodermic injection of morphia over the seat of pain gave relief and afforded some sleep. The emphysema, however, gradually increased, the pulse became weaker, and the patient died at 4 30 A.M. on Jan. 20th, about thirteen hours and a half after the sudden access of pain and collapse.

Necropsy thirty-two hours after death.—There was very marked subcutaneous emphysema of the face, neck and upper part of the chest. The emphysema could be detected as low as the groins. The abdomen was distended and tympanitic. On incising the left side of the chest there was a rush of air from the left pleural cavity. The left lung was seen to be partially collapsed. Each pleural cavity contained about a pint of dark grumous fluid, having the odour and appearance of the contents of the stomach. There was air in the loose areolar tissue of the mediastinum, as also here and there in the subpleural tissue. On the right side of the chest some old pleural adhesions were found, as well as a small cheesy nodule in the right lung. On the left side the lower portions of the pleural surfaces were hyperæmic and in an early stage of inflammation. On lifting forward the lungs the loose areolar tissue around the lower part of the œsophagus in the posterior mediastinum was found discoloured and distended with the same dark fluid which had found its way into the pleural cavities. The œsophagus having been cut across high up in the chest and then carefully slit up with scissors, a longitudinal rent an inch and a half long was found in its walls just above the diaphragm. The edges of the rent were sharply defined and gave no evidence of induration or of a pre-existing ulcerative or degenerative process. They bore no indication of post-mortem softening. No constriction or dilatation of the œsophagus existed, and no pouch or thinning of its walls could be detected. The heart was small but healthy. The stomach was rather dilated and was also distended, as were the intestines, with air. There was no evidence of post-mortem digestion of the walls of the stomach, which contained some thick dark fluid of the same character as that found in the pleural cavities. At the pyloric orifice a small nodule of carcinoma was found, and the whole circumference of the orifice was more or less thickened and indurated by the disease, which affected chiefly the posterior surface. The liver and spleen were small. There was nothing abnormal detected in the kidneys. The perforation, therefore, which had caused the sudden collapse and had given rise to the subcutaneous emphysema had occurred in the lower part of the healthy œsophagus immediately above the diaphragm, and had thus allowed, during the act of vomiting, the entrance of air and fluid from the stomach into the posterior mediastinum and the pleural cavities.

Remarks.—Rupture of the healthy œsophagus is an accident of such extreme rarity that the details of such a case are worthy of record. This subject is dealt with minutely in a very interesting article in Von Ziemssen's "Cyclopædia of the Practice of Medicine," vol. viii., page 90. In this article he states that the number of well-established cases, i.e. "those in which the symptoms during life, together with the post-mortem discoveries, distinctly prove that the rupture of the œsophagus found at the necropsy took place during life and must be considered as the only cause of death," amounts to nine. The references to these cases are given as follows: Boerhaave, Atrocis nec descripti prius Morbi Historia, Lugdunum Batavorum, 1724; Dryden, Medical Commentaries, Edinburgh, 1788, vol. iii., p. 308; Oppolzer, *Wiener Medicinische Wochenschrift*, 1851, p. 65; Habershon, Pathological and Practical Observations on Diseases of the Alimentary Canal, London, 1857, publishing the report of a case by Mr. Comley (this case is also published in Guy's Hospital Reports, April, 1843, vol. i., p. 113); Jos. Meyer, *Medicinische Vereinszeitung in Preussen*, 1858, Nos. 39, 40, 41; Granatzki, *Königsberger Inaugurale Dissertation*, 1867; Griffin, THE LANCET, Sept. 4th, 1869, p. 337; Charles, *Dublin Quarterly Journal of Medical Science*, 1870, vol. i., p. 311; and Fitz, *American Journal of the Medical Sciences*, Jan., 1877, p. 17. The last-named paper by Fitz, besides the very full report of the case which forms the subject of his communication, contains also an almost complete account of all the reported cases. He criticises them most minutely, and as a result of his study of them he only admits two or three as belonging properly to the list. Boerhaave appears to have reported the first case—viz., that of the great Admiral Baron Wassenaer, in 1724. A full and interesting account of it will be found in Von Ziemssen's article. The rupture resulted whilst straining in the attempt to relieve the stomach by vomiting, and the symptoms and post-mortem appearances were almost identical with those in my own case. The accident occurred suddenly in all the reported cases and was brought about in two of them by violent retching in order to remove a morsel of food caught in the œsophagus or pharynx, and in the other cases was preceded by nausea and vomiting or attempts at vomiting. Von Ziemssen remarks: "From a diagnostic point of view a very important symptom is the almost constant appearance of a rapidly developed emphysema of the skin, which, appearing first on the neck above the clavicles, soon extended over a large area and sometimes involved the whole surface of the body." Of eight cases there is but one in which it is not alluded to. The ninth (Oppolzer's) cannot be considered in this analysis of symptoms on account of its lack of all particulars. Dyspnœa, sometimes orthopnœa and great distress, followed the sudden onset in the cases reported and the pulse became much accelerated. With a continuous increase of all the symptoms death generally occurred in less than twenty-four hours (seven to nineteen), in one case after fifty hours and in another on the eighth day. In all the cases a rent was found in the œsophagus and always in the lower part of the canal. In Boerhaave's case the œsophagus was torn completely across, but in all the others the rent was longitudinal. In none of these cases was any tissue change found at the seat of the laceration which could be considered as a remote cause of the accident, and each case must therefore be looked upon as the rupture of a healthy œsophagus. Fitz, as before remarked, rejects nearly all the published cases and would explain the occurrence of the pneumothorax and subcutaneous emphysema as probably due to a rupture of the air passages during the violent straining, and the presence of the contents of the stomach in the pleural cavities as due to post-mortem digestion of the œsophagus. He considers that for rupture of the œsophagus two factors are essential—viz., the impaction of a foreign body in the canal and the exercise of great muscular force in the attempt to remove it. Von Ziemssen, however, cannot adopt the views of Fitz and accepts the nine published cases as authentic. He explains the occurrence of the rupture by the theory that a weakening of the walls of the œsophagus takes place—as has been proved to occur also in the stomach in very similar conditions—by a process of œsophago-malacia. He remarks, after sketching the prominent symptoms and post-mortem appearances, that "although the symptoms are totally unexplained by the supposition that the rent in the œsophagus took place merely in consequence of post-mortem softening, it seems wrong, while fully recognising the propriety of a profound scepticism in the presence of such unusual occurrences, totally to deny the existence of rupture of the œsophagus during life so long as there is any possibility of explaining it. Now it is scarcely credible that an œsophagus with tissues intact could be lacerated merely by its own contraction or by traction exercised by neighbouring parts (diaphragm, stomach), nor could we accept this explanation even for the cases (Meyer, Fitz) in which a not very large morsel of food engaged in the canal brought on violent contractions. ..... Accordingly, instead of rejecting them, we feel justified in believing that all these cases of so-called spontaneous rupture of the œsophagus may be referred to an antecedent vital œsophago-malacia—arising whilst the patient is in a healthy condition—very rapidly developed by special circumstances or surroundings." He adds: "We shall not go wrong in considering that atony of the muscular tissues of the œsophagus and cardia, caused by the habitual use of emetics and a tendency to regurgitation, forms the disposing cause of rupture."

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NOTES ON THE THERAPEUTICS OF EXALGINE.

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So much has been written of late in respect of the analgesic properties of exalgine (methyl-acetanilide) that I have been induced to give it a trial in suitable cases with results which seem to me to warrant their being placed on record. It appears to be generally recognised that exalgine is of great service in the treatment of neuralgic pains of a functional nature, and my own experience in this respect has

amply confirmed that of other and independent observers, but as most of the earlier cases under my own observation present no essential difference in their character or course, one or two doses of the drug almost invariably procuring immediate relief, I need only refer to one or two of the more typical.

CASE 1.—A young woman aged twenty-three came to me suffering from supra-orbital neuralgia on the left side, which she described as of extreme severity during the paroxysms. She begged me not to prescribe quinine for her, as on previous occasions, instead of affording relief, its administration had been followed by distressing headache and giddiness. I ordered a two-grain dose of exalgine to be taken immediately, the dose to be repeated every four hours while the pain lasted. The patient called the next day to inform me that the pain had disappeared within an hour of the first dose and had not since returned. She promised to return should it recur, and as I heard no more of her I am justified in assuming that the relief was permanent.

CASE 2.—A very nervous, excitable patient, aged sixty, a chronic dyspeptic, and a sufferer for many years from prolapsus uteri. She had been under my care off and on for the previous nine months, and on the last occasion she came to me complaining of unbearable pain at the top of the head, worse at night and interfering with sleep. There was some tenderness of the painful area, and she attributed her condition to an excess of family worries. I ordered one grain of exalgine three or four times a day, and on the occasion of her next visit she expressed her gratitude for the relief that had followed the first three doses both in respect of the pain and of the insomnia. When, however, she left off taking the medicine the symptoms returned, but on resuming the treatment she again experienced almost immediate relief. She asked my sanction to her keeping some of the medicine by her in case of any further trouble of the kind.

CASE 3.—This patient was aged twenty-five. In the fifth month of her second pregnancy she came to me complaining of intense supra-orbital neuralgia, to which she had been subject for the last three months. A single dose of exalgine at once stopped the pain, which, however, returned in a few hours, when a repetition of the dose again afforded immediate relief. She has since remained free from pain.

CASE 4.—A nervous emotional girl, aged nineteen, of the neurotic type. Menstruation was irregular and scanty, and she complained of rather profuse leucorrhœa. She came to me on account of violent pain at the vertex, with a sensation "as if something were creeping about inside the skull." I gave her one-grain doses of exalgine to be taken three times daily, and within two days the feeling and the pain disappeared entirely. She was then put on Blaud's pill, but the headache at once returned, yielding, however, to a few more doses of exalgine. Since then this patient has had one or two recurrences of the symptoms, which, however, have invariably yielded to a few doses of the drug.

The encouraging results in these and other similar cases of pain of a neuralgic character, associated or not with other subjective symptoms or sensations, induced me to try exalgine in a number of cases of mental disease associated with similar subjective phenomena, some in an incipient and others in an advanced stage. Though perhaps the treatment may be considered empirical, I think the effects justified its employment. I append notes of the more interesting of these cases.

CASE 5.—A young woman aged twenty-eight first came under my care in May, 1892. She then complained of mental depression and I gathered that she often wandered about London all day having no settled purpose, and she was obviously unable to confine her attention to any given subject. She experienced constant pain across the forehead and in the eyeballs and a bright light caused acute discomfort. Her aspect was melancholy and suspicious, but she did not seem subject to any actual hallucinations or delusions. She was treated for a time *secundum artem* with the bromides, the ammonio-citrate of iron, iodide of potassium &c., and all proved equally inefficacious. On Aug. 15th I prescribed for her one-grain doses of exalgine to be taken three times daily. On Aug. 29th she returned, saying that she had been much better ever since she began taking the last medicine. The intolerance of light had altogether disappeared and the headache returned only at rarer intervals and was always relieved by a dose or two of the medicine. The mental symptoms remained unchanged. I have lately been informed by a relative, however, that since she ceased to be troubled by the pain in the head her general condition has undergone marked improvement—in fact, she was "better in every way."

CASE 6.—The patient, aged forty-two, was very melancholy, heard voices and saw imaginary figures. She was deaf and her aspect was peculiarly dull and heavy. She complained of a dull pain at the top of the head and sleeplessness. Since November, 1891, when she first came under my notice, she had been under much the same treatment as the preceding patient (Case 5), and with equally unsatisfactory results. In August last I prescribed for her, to begin with, one-grain doses of exalgine four times a day, and within a day or two she declared the headache to be much better and sleep less disturbed. She then appeared more cheerful and hopeful, but her hallucinations remained unchanged. In this, as in the preceding case, the mental condition improved to some extent coincidently with the relief afforded by the treatment in respect of the painful sensations.

CASE 7.—In this case the patient, aged twenty-nine, was in the early stage of general paralysis of the melancholic type. I first saw him in May, 1892. The patient's father stated that his memory had been gradually failing for twelve months past, and that he had recently become quite incapacitated for work. I found him in an emotional state, crying or laughing on slight or no provocation, and he had delusions of being "shadowed." The physical symptoms of general paralysis were well marked. He could, however, talk fairly rationally and his principal complaint was of a constant aching, burning and pricking pain at the top of the head. He was put under the usual treatment for three months, during which period he had one congestive attack, and in August, as he still complained bitterly of the pain in the head, I prescribed exalgine in the usual dose of one grain repeated several times daily. When he came again he was much brighter, and he gleefully told me that his headache had disappeared after one or two doses of the new medicine and that he had since been free from it. His father confirmed the statement, adding that he had quite ceased to complain of his head. He has continued the medicine off and on up to the present time and has remained free from the distressing headache, for which he professes himself extremely grateful. His incurable disease is naturally pursuing its course and he is gradually becoming more "lost."

CASE 8.—I first saw this young woman, who was twenty-four years of age, in January, 1892, she having just been removed from a lunatic asylum by her friends in opposition to the advice of the superintendent. I found her strongly melancholic with a tendency to suicide. She was subject to strong emotional outbreaks. I recommended her immediate reinternation in an asylum, but my advice was not acted on and I lost sight of her until August last, when she again presented herself. In addition to her former symptoms she then complained of an "awful pain" in the head, which kept her awake at night. Bromide of potassium in ten-grain doses proved useless and at a subsequent interview I added one-grain doses of exalgine. Within a day or two the pain had become markedly less and she was again able to enjoy a good night's rest. She has since continued the treatment under exalgine alone and she finds that this controls the headache, though her purely mental symptoms are unimproved.

CASE 9.—This case has been under my care since May, 1892. The patient, who was thirty-four years of age, had an accident (a fall on the head) twelve years ago, since which time he had been subject to epileptic attacks, which sometimes occurred as often as six times in a single day. Memory had of late begun to fail. The fits were succeeded by very severe headache across the brows. He was ordered bromide of potassium, which did not in the least affect the frequency of the fits or the headache, though given in large doses for a period of not less than three months. The following are the *verbatim* notes from my case-book:—"Aug. 15th: Has been having four and five fits a day and his headache has been unbearable. For the latter he was ordered two-grain doses of exalgine in infusion of quassia three times a day.—Aug. 22nd: He has only had one fit since his visit on Aug. 15th, and he says this was the best week he has had for months. The headache is much better and he notices a marked improvement after each dose of the new medicine, which he was ordered to continue.—Aug. 29th: Has again only had one fit since last visit, but has been told that the fit was a strong one. Is now quite free from headache and has been enabled to resume his occupation." This patient is still under treatment.

Remarks.—In giving notes of the foregoing cases I do so without attempting any explanation of the physiological action of exalgine. It must, however, be something more

than a mere coincidence that so many cases of violent head pain should have promptly yielded to the drug even in small doses such as I gave, and this, in several instances, after the ordinary remedies had failed to produce any effect. I confess that I at first used the drug in the mental cases without much hope, but rather as a *dernier ressort* in cases of early melancholia, associated with headache and insomnia, in which other methods of treatment had proved futile—cases which are but too common in the experience of the alienist physician. I did not, of course, expect to benefit the mental condition by means of exalgine, but in all the cases I succeeded in relieving some of the more distressing symptoms—e.g., headache and insomnia. This remark applies with special emphasis in respect of Case 7, in which no idea of a cure could be entertained; but the patient's remnant of life has certainly been rendered more bearable by the alleviation of the intolerable headache. In Case 9, that of the epileptic man, some possibilities seem to be opened up. That the exalgine practically cured the headache there cannot be the least doubt, but it also appeared to lessen the frequency of the fits. That, at any rate, is the opinion of the patient and myself in view of the fact that whilst under observation the number of the fits fell from four or five a day to about one a week. He still goes for days without having a fit, which had never been the case previously. It seems to me, therefore, that exalgine may, in common with bromide of potassium and borax, possess the power of staving off the fits (in this patient the bromides had proved utterly useless). I am now making further observations with exalgine in the treatment of epilepsy, and propose to give the results of the treatment on some future occasion. In the above cases I have not included several in which, after some improvement, I lost sight of the patient, or others where the patient was not seen again after the first visit, though I have heard indirectly that improvement had taken place, rendering further advice unnecessary. Neither have I included patients who were taking other drugs—mercury or the bromides—in conjunction with exalgine. I have never seen any bad result follow the use of exalgine, but I have never prescribed it in larger doses than two grains every four hours. As a general rule, I have found one-grain doses repeated several times daily to be sufficient for my purpose. Cases 6, 7, 8 and 9 were under my care at a hospital. The remainder occurred in my private practice. A convenient way of prescribing exalgine is to order the dose to be dissolved in ten minims of spirit of chloroform, water or some infusion being added to make up the ounce.

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THE CHOLERA EPIDEMIC IN RUSSIA.

BY FRANK CLEMOW, M.D. EDIN. &c.

No. III.—IN EUROPEAN RUSSIA.

THE epidemic of 1892 entered European Russia, as did many earlier outbreaks, mainly, but not entirely, through the mouths of the Volga. A second route followed by the disease may be indicated by a line drawn across the Caucasus from Baku to Rostof-on-Don, thence to the southern governments bordering the Sea of Azov and the Black Sea, and to the south-western group of governments known as the Ukraine.[1] A comparison of the dates upon which the earliest cases of cholera occurred in each of the governments marking these two routes shows very clearly that the epidemic spread with much greater speed by the first route than by the second. The immense waterway of the Volga formed a channel along which the infection travelled with almost startling rapidity. The earliest case of cholera in the government (not in the town) of Astrakhan occurred on June 13th.[2] On the 14th the disease appeared in the government of Saratof, on the 23rd in that of Samara, on the 24th in that of Simbirsk; and on the 25th cases of cholera were reported in the government of Kazan. The epidemic had thus travelled in a northerly direction, along the course of the Volga, a distance of 1784 versts (nearly 1200 miles) in the space of twelve days. In what may for brevity be termed the south-western branch of the epidemic, the first town to be affected on the European side of the Caucasian frontier was Rostof-on-Don, one of the chief towns in the territory of the Don Cossacks, and situated, as its name implies, on the River Don. Cholera manifested itself here on June 28th. In the neighbouring government of Kharkof no case was reported until ten days later (July 8th). On July 12th the infection spread to the adjoining government of Poltava. For a considerable period the epidemic travelled no further in this direction. Not until July 23rd was cholera reported from the government of Ekaterinoslav (situated to the south of Kharkof and Poltava, and to the west of the Don Cossack province). On August 3rd the disease appeared in the Taurida (the government which includes the Crimea); on the 8th in Kherson; on the 16th in Kief; whilst it did not spread to the border governments of Bessarabia and Podolia until the 26th and 30th of August respectively. Whilst the infection was thus travelling comparatively slowly along the shores of the Black Sea, it was also passing from Rostof-on-Don in a northerly direction. On July 2nd, only four days later than the occurrence of the first case of cholera at Rostof, the disease appeared in the town and government of Voronezh. Between Rostof and Voronezh is a distance of 610 versts (about 400 miles). The two towns are connected by a line of railway. They are also connected by the River Don,[3] which drains the whole of the government of Voronezh. The Don is navigable by steamer for half the distance between the towns of Rostof and Voronezh and by smaller craft for the remainder of the distance. Communication by the railway is, of course, much more rapid than by the river, the journey taking exactly twenty-four hours. There is evidence to prove that in this instance the railway was the means of conveying the infection. Cases of cholera occurred at stations on the Rostof-Voronezh Railway on July 1st, and on July 2nd the disease appeared in the town of Voronezh. The rapidity with which cholera spread up the Volga was in marked contrast with the comparative slowness with which it followed the course of the Dnieper, if, indeed, that river can be said in any way to have formed a channel by which the infection was carried. The Dnieper is almost unnavigable. The wide estuary below Kherson is too shallow to allow of large vessels entering the river from the sea. To the south of Ekaterinoslav the course of the river is interrupted for a distance of seventy versts by a series of falls varying in height from eight to twelve feet. To the north of this the river is navigable with safety only in the spring; in the summer the many and constantly shifting sandbanks render navigation difficult and at times impossible. The earliest case of cholera in any town on the banks of the Dnieper occurred at Ekaterinoslav on July 28th. The first case in the town of Kief, about 350 versts (240 miles) higher up the river, is stated to have been on Aug. 16th; in the governments of Tchernigof and Mogilef, through which the Dnieper flows, the disease appeared on Sept. 5th and Aug. 30th respectively; whilst in Smolensk, the government in which the river takes its rise, no case of cholera was reported before Sept. 26th.

It will be well to briefly recapitulate these facts. Along the channel of the Volga, upon whose waters almost the whole of the traffic of Central and Eastern Russia is carried during the summer, the cholera infection travelled a distance of nearly 1200 miles in twelve days. On the Dnieper, on the other hand, a river which is in no sense a great channel of communication, an interval of nineteen days elapsed between the dates of the appearance of cholera in two towns only 240 miles apart; whilst the long period of sixty days separated the dates of invasion by the disease of Ekaterinoslav and Smolensk, distant (by the river) about 600 miles the one from the other. Having traced the epidemic along the Volga as far as Kazan, it will be convenient to continue a brief itinerary of its course beyond that ancient capital of the Tartars. A few versts to the south of Kazan the Volga is joined by the immense stream of the Kama, which drains the three large governments of Viatka, Perm and Ufa. From Viatka the first case of cholera was reported on June 27th, from Perm on July 6th and from Ufa on July 18th. From Kazan the main channel of the Volga may be traced to its source through the following governments in the order named: Nijni Novgorod, where the earliest case of cholera occurred on July 7th; Kostroma, first affected on July 18th; Yaroslavl, first affected on July 21st; and, finally, Tver, where the disease appeared on Aug. 5th. It is scarcely necessary to repeat here in detail the dates upon which the first cases of

[1] The district known as the Ukraine comprises the six governments of Volhynia, Podolia, Kief, Tchernigof, Poltava and Kharkof.

[2] As in the previous articles, every date mentioned is according to the Old Style.

[3] The town of Voronezh lies on a river of the same name at no great distance from the junction of this river with the Don.

TABLE OF THE CHOLERA EPIDEMIC IN THE RUSSIAN EMPIRE TO DEC. 1ST, 1892 (OLD STYLE).

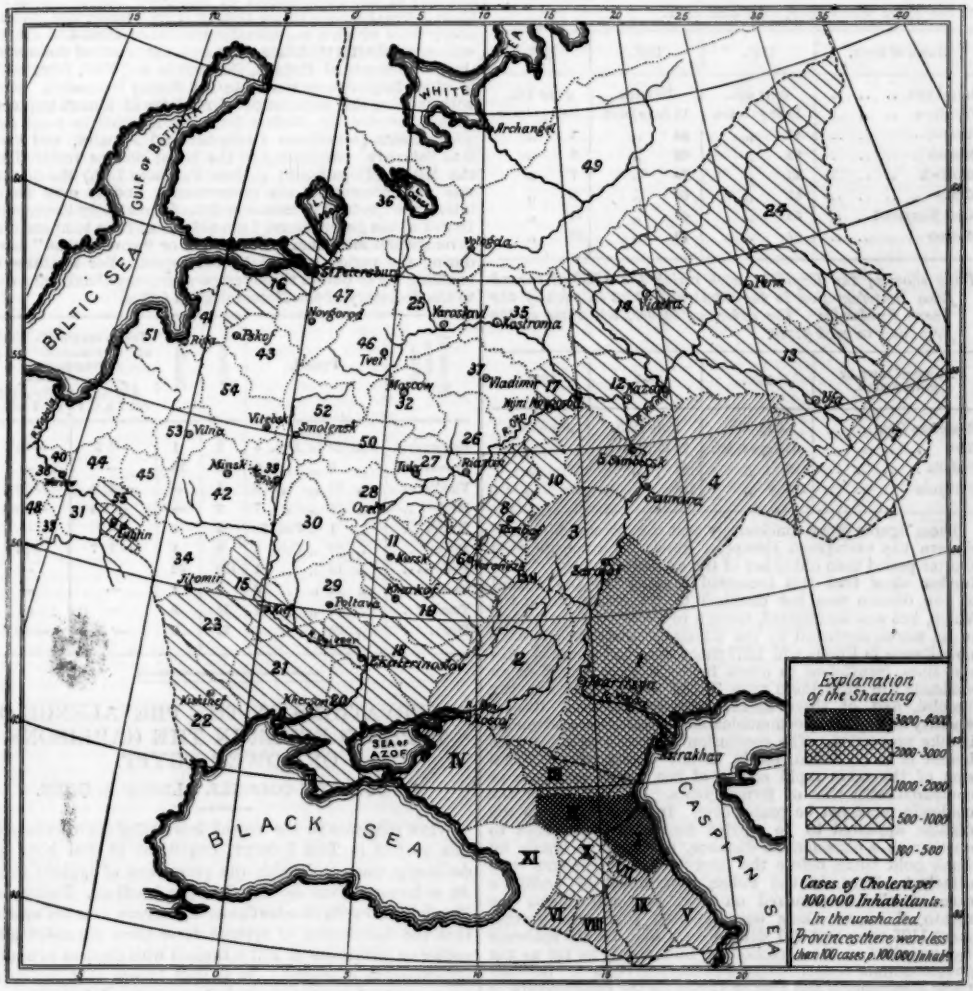
No. in Map.	Name of Government or Province.	Cases.	Deaths.	Per 100,000 inhabitants (in round figures). Cases.	Per 100,000 inhabitants (in round figures). Deaths.	Percentage of deaths to cases.	Date of occurrence of first case of cholera.
1	Astrakhan*	21,960	10,980	2,494	1,247	—	June 13th
2	Don Cossacks*	37,680	18,295	1,812	880	48·5	June 28th
3	Saratof†	41,887	21,091	1,721	866	50·3	June 14th
4	Samara†	41,369	18,115	1,556	682	43·8	June 23rd
5	Simbirsk†	17,143	7,347	1,028	440	42·8	June 24th
6	Voronezh†	24,046	12,082	894	449	50·2	July 2nd
7	Orenburg†	10,304	5,339	746	387	51·8	July 8th
8	Tambof	21,284	9,078	733	313	42·7	July 16th
9	Lublin	5,683	2,275	536	214	40	August 1st
10	Penza†	7,727	3,514	483	219	45·5	July 8th
11	Kursk†	10,164	4,247	397	166	41·8	July 14th
12	Kazan†	8,337	3,703	380	169	44·4	June 25th
13	Ufa†	7,359	3,511	353	168	47·7	July 18th
14	Viatka*	10,307	4,681	343	156	45·3	June 27th
15	Kief	10,562	3,720	336	118	35·2	August 16th
16	St. Petersburg†	5,423	1,602	290	86	29·5	July 20th
17	Nijni Novgorod†	4,347	1,917	280	124	44	July 7th
18	Ekaterinoslav†	4,281	1,896	258	114	44·3	July 23rd
19	Kharkof†	6,780	2,569	255	104	41	July 8th
20	Taurida†	2,454	1,365	215	120	55·6	August 3rd
21	Kherson	4,802	2,224	219	101	46·3	August 8th
22	Bessarabia	3,070	1,285	194	81	41·8	August 26th
23	Podolia	3,884	1,423	148	54	36·8	August 30th
24	Perm†	4,206	2,052	150	73	48·7	July 6th
25	Yaroslavl*	1,241	548	104	46	44·1	July 21st
26	Riazan†	1,752	893	90	46	51	July 10th
27	Tula†	1,370	361	84	24	29	July 26th
28	Orel†	1,514	630	71	30	41·6	July 17th
29	Poltava	1,992	863	70	30	43·2	July 8th
30	Tchernigof	1,562	484	70	22	31	September 5th
31	Radom	759	231	99	43	43·6	September 19th
32	Moscow†	1,515	783	68	35	51·7	July 20th
33	Kielce*	364	191	52	27	52·5	September 13th
34	Volhynia	1,162	453	49	18	39	September 3rd
35	Kostroma*	428	212	31	15	49·5	July 18th
36	Olonetz*	107	52	27	13	48·6	August 21st
37	Vladimir*	281	160	19	11	57	July 19th
38	Warsaw*	170	71	17	7	41·8	September 11th
39	Mogilef†	221	99	16	7	44·8	August 30th
40	Plock	78	52	12	7	66·6	October 14th
41	Livonia*	93	48	8	4	51·6	September 5th
42	Minsk	150	70	8	4	46·6	September 19th
43	Pskof	62	31	6	3	50	September 23rd
44	Lomza	51	24	8	4	47	October 22nd
45	Grodno	60	32	5	3	53·6	September 12th
46	Tver*	46	15	3	1	33	August 5th
47	Novgorod*	17	12	2	1·4	70	August 15th
48	Piotrkow*	10	2	1	0·2	—	September 29th
49	Vologda*	10	4	1	0·4	—	August 20th
50	Kaluga*	7	7	0·6	0·6	—	October 17th
51	Courland*	7	3	1	0·4	—	October 10th
52	Smolensk*	4	4	0·3	0·3	—	September 20th
53	Vilna*	7	4	0·5	0·3	—	November
54	Vitebsk*	2	2	0·1	0·1	—	November
55	Siedlec	1,588	862	211	114	54	September
	Total for European Russia (excluding Finland)	331,077	151,625	331	152	45·8	—
I.	Daghestan*	23,471	10,457	3,912	1,744	44·5	June 18th
II.	Terek†	27,071	13,114	3,384	1,639	48·5	June 18th
III.	Stavropol*	14,802	7,280	2,115	1,040	49·2	July 29th
IV.	Kuban†	28,750	15,100	1,944	1,020	52·5	June 18th
V.	Baku†	11,251	6,876	1,607	982	61·1	June 6th
VI.	Kars†	2,937	1,378	1,468	689	46·9	July 20th
VII.	Zakataly†	991	598	1,300	793	60·3	June 21st
VIII.	Erivan†	9 153	5,504	1,308	786	60·1	July 7th
IX.	Elizavetpol†	9,716	5,690	1,079	632	58·5	July 18th
X.	Tiflis†	5,995	3,118	749	390	52·0	June 13th
XI	Kutais†	613	308	6	3	50·2	July 22nd
	Total for the Caucasus	134,758	69,423	2,105	1,084	51·5	—
	Central Asia and Siberia	89,175	46,831	—	—	52·5	—
	Total for the Russian Empire	555,010	267,880	—	—	48·2	—

* The epidemic was at an end by Dec. 1st.

† The epidemic was almost but not quite extinct by Dec. 1st. In the remaining governments the epidemic was still active in December.

MAP OF RUSSIA,

TO ILLUSTRATE THE INTENSITY OF THE EPIDEMIC OF CHOLERA.



The shading represents a varying ratio of cases of cholera per 100,000 of population. The figures apply to names of provinces referred to in the Table on the preceding page.

cholera occurred in each of the remaining governments. They will be found stated, with as near an approach to accuracy as possible, in the last column of the table accompanying this article. The further course of the epidemic may be briefly summarised as follows: Before the month of July was over, nearly all the central governments had been overrun by the disease, which had also appeared in St. Petersburg. On Aug. 1st cases occurred in Lublin, one of the ten Polish governments. During August cholera invaded most of the southern and south-western governments, and in the north those of Tver, Novgorod, Vologda and Olonetz. During September, October and November all the remaining governments of European Russia were returned as affected by the disease, with the following exceptions: the governments of Archangel, Esthonia (including the important port of Reval) and Kovno, the two Polish governments of Suvalki and Kalisz, and the Principality of Finland. These governments have remained free from cholera throughout the epidemic.

Before leaving this branch of the subject it will be of interest to compare the speed with which the cholera epidemic of last year travelled with that attained by earlier epidemics. In the first article of this series it was stated that the recent outbreak had spread through Russia with unprecedented rapidity. Unfortunately the records of past epidemics in the regions then under notice—that is to say in Central Asia and Siberia—were not available for the purpose of comparison. But the case is different in European Russia. Thanks to the labours of Dr. Archangelski, we possess in his invaluable work on "Cholera Epidemics in European Russia during the Fifty Years 1823-72"[4] an exhaustive account of all the previous outbreaks of the disease so far as concerns their course on this side of the Caspian Sea and the Ural Mountains. By the aid of these records it is possible to substantiate the statement just made as to the relative speed of the epidemic of 1892. In 1830 and 1847, years in which cholera followed the same route as it did last

[4] St. Petersburg, 1874.

year, the first case recorded in Astrakhan was, by a curious coincidence, on the same date, July 4th, in each year.

Table showing the Number of Days which elapsed between the occurrence of the First Case of Cholera in Astrakhan and that of the First Case in each of the Towns named under the Three Years 1830, 1847 and 1892.

Name of town.	1830.	1847.	1892.
Astrakhan	July 4th.	July 4th.	June 7th.
Tsaritzyn	12 days later.	12 days later.	5 days later.
Saratof	18 ,,	38 ,,	1 ,,
Samara	36 ,,	66 ,,	6 ,,
Simbirsk	43 ,,	70 ,,	7 ,,
Kazan	51 ,,	63 ,,	8 ,,
Nijni Novgorod	38 ,,	67 ,,	20 ,,
Moscow	57 ,,	76 ,,	33 ,,

Table showing the Rapidity with which the Cholera spread from Rostof-on-Don to the South and West in each of the Three Epidemics. The dates, as before, are those of the first cases in each place.

Name of town or government.	1830.	1847.	1892.
Rostof-on-Don	Aug. 6th.	July 12th.	June 18th.
Kief	62 days later.	73 days later.	49 days later.
Podolia	88 ,,	81 ,,	63 ,,
Volhynia	123 ,,	131 ,,	67 ,,

These figures prove conclusively that the latest epidemic of cholera has overspread European Russia in a considerably shorter period than did either of the earlier outbreaks. They further show that this increased rapidity in the spread of the disease was not confined to its course along the Volga, but was manifested, though to a less striking degree, in its march westward to the Ukraine. In 1830 there were no railways in Russia; in 1847 there were 343 versts of railway lines, insufficient to affect in any way the spread of an epidemic; in 1892 there were 30,366 versts of line in the Empire, and of these 28,191 were in European Russia. Facility and speed of communication by water have advanced in like proportion. The conclusion appears inevitable that herein is to be found, partly, if not wholly, the explanation of the more rapid course of last year's epidemic as compared with that of former years. One feature of the epidemic must not be passed over. In some instances the disease appeared to be carried from one government to another at a considerable distance, and even to obtain no small hold there, before the intervening governments were attacked. Thus, in the Polish government of Lublin a case of cholera occurred on Aug. 1st, and during the month of August there were reported from that government 1125 cases and 337 deaths. On Aug. 1st the epidemic had travelled in the direction of Lublin only as far as the governments of Ekaterinoslav, Kharkof and Poltava. Between these governments and that of Lublin lie the governments of Kief and Volhynia, which remained free from the disease until Aug. 16th and Sept. 3rd respectively, or fifteen and thirty-three days later than the date of the first case in Lublin. In like manner cholera appeared at Moscow and St. Petersburg on the same date (July 20th), whilst the intermediate governments of Tver and Novgorod were not affected until sixteen and twenty-six days later respectively.

Up to the present only the direction followed by the cholera epidemic and the rapidity with which it overspread the country have been considered, without reference to the amount of sickness and death caused by it in the various governments named. In the table on p. 788 will be found the full statistics of the epidemic from its commencement to December 1st (Old Style). The numbers of cases and deaths and the ratio which these bore to the population in every government affected by the disease in European Russia and the Caucasus are there stated. The number of cases recorded per 100,000 inhabitants has been taken as the standard of intensity of the epidemic, and the governments have been arranged and numbered in descending order of the intensity with which they were affected. In order to present more clearly the distribution of the epidemic I have prepared a map of the country, and have endeavoured to show by a scheme of shading the relative hold obtained by cholera in each of the governments in which there were more than 100 cases per 100,000 inhabitants. It is important to note that, whilst the epidemic was at an end, or practically at an end, in a large majority of the governments of European Russia and in all those of the Caucasus before Dec. 1st there were sixteen governments from which a considerable number of cases and deaths was reported after that date. The most important of these were the governments of Podolia, Bessarabia and Kief, from each of which large figures were returned during December. Notwithstanding the occurrence of a winter of almost unprecedented severity the cholera infection lingered in some few governments throughout December and January, and even into February. According to the latest returns received by the Medical Department (before February 18th) the disease was still present in ten governments, and it may be of interest to quote their names and the figures of the last report. In five of the governments I am able to add the temperatures (average and minimum) of the chief or "government" town during the period covered by the report. For facilities in enabling me to obtain these temperatures my thanks are due to the Secretary of the Meteorological Office.

Name of Government.	Period.	Cases.	Deaths.	Temperature (Celsius) of "Government" town during period. Average (at 7 A.M.)	Minimum (at 7 A.M.)
	From				
Bessarabia.	Jan. 19 to Feb. 4	2	1	—5·5	—20·2
Voronezh	,, 8 ,, ,, 8	42	18	—	—
Viatka	,, 18 ,, ,, 2	1	—	—21·8	—35·8
Kief	,, 24 ,, ,, 7	2	—	—7·4	—25·8
Kursk	,, 1 ,, Jan. 31	2	2	—	—
Penza	,, 25 ,, Feb. 8	2	1	—12·7	—34·4
Podolia	,, 16 ,, ,, 1	150	52	—	—
Samara	,, 11 ,, ,, 3	3	1	—	—
Tambof	,, 22 ,, ,, 7	15	9	—	—
Ufa	,, 29 ,, ,, 3	21	9	—7	—10·7

OBSERVATIONS ON THE PREVALENCE OF TYPHOID FEVER IN THE GARRISONS OF LOWER EGYPT.

BY SURGEON-COLONEL ALBERT A. GORE.

WITH reference to the recent interesting contributions on this subject in THE LANCET, conditions of soil have undoubtedly much to do with the prevalence of typhoid fever. At a lecture given in the Sanitary Institute, Dublin, on March 18th, by Sir Charles Cameron, he gave it as his opinion that the distribution of typhoid fever there depended altogether on conditions of soil saturated with matters of a most objectionable character. It is well known that regiments newly arrived in that garrison have suffered from time to time a good deal from enteric fever. In thirteen years, 1872–84, the French army was composed of a total effective of 3,375,409 men, yielding 151,319 cases of typhoid fever and losing from that disease 17,642 men, or 14·76 per cent. of the cases treated—a third of the total mortality of the army. With regard to sanitation M. Brouardel writes: "The number of soldiers attacked by typhoid fever is always relatively more high than that of the inhabitants of the towns which they are sent to garrison. The young men taken for military service are about the same age as those who are most often attacked with typhoid fever. They are in the same condition of non-acclimatisation in their new domiciles, they are equally sensible of typhoid fever, and we can consider them as the precise test of the salubrity of the towns. In a town where typhoid fever is endemic, when acclimatised to the plague, it acts by degrees on the greater number of the inhabitants; but import all of a sudden a group of young men not having been under the same influences, and we cause in them a veritable epidemic. The aptitude for contracting the disease is five or six times greater among the military on account

of age and the non-acclimatisation indicated before. The most absolute law is that the mortality in the army by typhoid fever permits one to judge of the salubrity of a town."[1] To the fouling of the subsoil in India is attributed much of the typhoid fever which prevails, which insanitary condition of soil infects the air and water. When this condition in Europe has had such a powerful influence on the French Army, it is not to be surprised at that in such towns as Cairo and Alexandria (where to the local insanitary conditions the debilitating influence of heat on the nervous system is superadded) young and unacclimatised soldiers should suffer in a greater degree than the inhabitants. Sir James Hanbury, after the campaign of 1882, when out of an average strength of 13,466 (July 17th to Dec. 31st), the disease caused 575 admissions and 223 deaths, very aptly summed up the situation in the following words:—"To describe its genesis to any one specific cause would not, I think, in this case be justified by reason or experience. The causes were multiple; but one of the most potent, in my opinion, was the exposure under canvas on ground in the neighbourhood of a large city whose conservancy arrangements were on the most primitive system, and the filthy habits of the lower classes acting on a body of men lowered by the privations, hard work and exposure in a campaign during the hottest and most unhealthy season." This large body of men, it will be recollected, was of the most liable age, and undergoing that constitutional change commonly called acclimatisation. During 1883-84 and 1885 several regiments suffered severely from enteric fever in Ramleh Barracks, which, when taken over on being evacuated by Arabi's troops in 1882, were in a very filthy condition, as was the vicinity. They were built on rubbish, into which the leakage from drains and cesspits as also from the stables had soaked, rendering apparently the site inherently unhealthy by contamination of the subsoil. Referring to them in 1884, Brigade-Surgeon Ramsbotham writes: "This localisation seems to indicate that it is not to the water-supply of the town that we must look for the causation of the disease, but other causes, and the conclusion arrived at is that the chief cause to be assigned for the prevalence of fever in these barracks must be looked for in the saturation of almost the whole of the soil underneath them by sewage matter in past years, caused by cesspits and drains being built without inverts, the bottoms being thus left open and allowing the sewage to percolate the soil." With regard to contamination of the air, the following note appeared in the *Egyptian Gazette* of May 20th, 1889, the very month when fever was beginning to show itself: "The attention of the sanitary authorities is directed to the pestilential exhalations emanating from the sewers in the Ramleh Boulevard, Alexandria, and its neighbourhood. Too much vigilance cannot be exercised at this season of the year in all matters affecting the public health."

The question of water-supply and its influence depends upon whether it is filtered or unfiltered apparently. When enteric fever first appeared among the troops at Ramleh in 1882 it was attributed in the first instance to the use of well-water fouled by adjacent compounds, in each of which was a cesspit without inverts, made of loose rubble, seldom emptied, and so allowing the subsoil to be thoroughly saturated with liquid sewage, which of course percolated into the wells. A contributor to one of the medical journals at this time wrote: "The fresh water canal close by was polluted with filth as if by design." Later on it was recommended by the Principal Medical Officer of Alexandria (Deputy Surgeon-General Fox) that the water should be boiled before being filtered, and for this purpose appliances and an allowance of fuel were granted by the military authorities. The Mahmoodeeyeh, or sweet-water canal, taps the Rosetta branch of the Nile at Atfeh, fifty miles from Alexandria. It receives many impurities. During 1883 no less than 472 human corpses were found in the Nile from which it springs, and on Feb. 1st, 1889, appeared the following paragraph in the *Egyptian Gazette* with reference to the canal: "In consequence of the many complaints received from the inhabitants of Alexandria and from Mr. Cornish, the manager of the Alexandria water company, as to the bad quality of the water now obtainable from the Mahmoodeeyeh canal for consumption in town, his Excellency Riaz Pasha has requested the Minister of Public Works and the Director-General of the Board of Health to appoint a Commission entrusted with the immediate examination of the question and with powers to report as to the measures that should be taken to improve the Alexandria water-supply." This Commission recommended "that all drains running into the canal from the villages along its banks should be closed, and that fresh outlets for the drains should be made to discharge on the canal side; that strict orders should be given to the inhabitants along the banks to cease making the canal the receptacle for every description of filth and rubbish, and that these orders should be enforced by severe punishment in case of their being disregarded; that carcases of animals should be promptly removed when seen in the canal; that the canal should be systematically patrolled under the direction of the Irrigation Department, who on their part would open the lock at Kafr Dawar once every ten days in order to allow a good flush of fresh water to come in from the Katetbeh canal." That unfiltered water of this description, or water obtained from wells in the lower quarters of Alexandria, is made into "ginger pop" and other drinks, and purchased by soldiers, is very probable. But with regard to the filtered water a medical officer was sent from Cairo to make an analysis of this when enteric fever was very prevalent in Ramleh Barracks. He reported "that it contained a small amount of chlorides, a low percentage of fixed and volatile solids, and freedom from hardness—characters, on the whole, of a pure and wholesome water, with no signs of sewage contamination." That the germs of enteric fever may be carried from one station to another is proved by the fact that the troops which went from Ramleh to Cairo for the review carried them with them, and for three months after leaving Egypt cases continued to occur in regiments which left the command. At intervals cases were admitted from H.M. ships in harbour, the crews being healthy and drinking condensed water on board. These have been very few and were probably contracted on shore when the men were on leave.

Temperature has a considerable influence as a rule. The mean air temperature is at its minimum in January, and rises gradually during February, March, April and May, but much more quickly in June and July, when at Cairo it reaches its maximum. The Nile rises rapidly in August and reaches its maximum in September, falls somewhat in October and then more quickly subsides. With its rise the mean air temperature commences to fall. In the years 1883–89 inclusive, the ratio per 1000 of admissions for enteric fever in the Egyptian command increased with the temperature, was highest in May and June and lowest in December. At Alexandria it is most prevalent in the autumnal and damper months of August, September, October and November. Milk in Egypt is systematically adulterated with water and much of it is obtained from the buffalo, a filthy feeder. As long as the nomenclature of diseases is worded as at present many cases of enteric fever will be included amongst those recorded under the heading "Simple Continued Fever," defined as a simple fever with no distinguishing characteristics. Many of the cases are of twenty-one days' duration or longer, with a curve of temperature very similar to that of typhoid fever, but with no diarrhœa, rose spots or enlargement of the spleen. It cannot be forgotten that with reference to these Liebermeister has written: "The diseases produced by the specific poison of typhoid fever differ a good deal among themselves. Some are so serious that life is almost inevitably destroyed; others so trifling that patient and physician are left in doubt whether there was disease at all. Between these two extremes at every gradation the lighter cases are often called a febrile or febrile abdominal catarrh, gastric fever &c., a custom practically not unjustifiable," and "in numerous epidemics the imperfect cases are more common than the perfect ones." The well-known rule that the greatest predisposition is beween the ages of fifteen and thirty years has been amply verified by the medical statistics of the army in Egypt. Of 119 fatal cases recorded at Alexandria from 1883 to 1890 inclusive, only 2 were over thirty years of age, and of the whole only 18 exceeded twenty-five years. Many cases were imported by regiments from "up Nile" and Suakin, and did not originate at Alexandria, and during this period the more acclimatised regiments and smaller units in the garrison suffered least. There were several admissions for ague, the greater number imported, but several of these originated in the musketry camp at Meks until removed from the site overlooking the marshy banks of Lake Mariotis. Nearly all the cases of remittent fever were from Cyprus or other Mediterranean stations. Of late years, since the water of the canal has filtrated into the subsoil at Suez and Ismailia, intermittent fever has been more common at those stations.

The shore about Alexandria is fouled by filth of all kinds, and many drains open on to it. During the high winds of winter seaweed is thrown up and with the summer heat

[1] La Semaine Médicale, Dec. 12th, 1888.

decays and gives rise to very unpleasant odours. Owing to some pandemic cause or seasonal influence some years are more unhealthy than others, and some summers are cooler, and there are differences in the internal economy of regiments which influence their respective health-rates.

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL AND THERAPEUTICAL.

AN ILLUSTRATION OF THE ADVANTAGES OF THE CRÉDÉ METHOD IN THE PREVENTION OF OPHTHALMIA NEONATORUM.

BY WALTER W. HEELAS, M.R.C.S., L.R.C.P. LOND.,
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I AM indebted to Dr. Herman and Dr. Cullingworth, under whose care the patients were, for permission to publish the following notes.

The excellent results to be obtained from the Crédé method for the prevention of ophthalmia in new-born infants are exemplified in the following brief notes of an outbreak so cut short in the wards of the General Lying-in Hospital. The method consists in dropping a two per cent. solution of nitrate of silver into the eyes immediately the head is born. Up to the time of the outbreak the usual method of treating the eyes in this hospital had consisted in wiping them with clean cotton-wool as soon as the head was born (the wool being immediately afterwards burnt). A few drops of perchloride of mercury solution (1 in 2000) were dropped in each eye after birth, and this was repeated twice a day during the fourteen days the infant remained in the hospital; and every mother had a vaginal douche of Condy's Fluid (half an ounce to the pint of water) previously to delivery. At the end of last and at the commencement of this year numerous cases of ophthalmia occurred in the hospital for which no cause could be found. From Jan. 1st to 22nd out of seventeen children born alive seven were so affected, this being more than 42 per cent. On the latter date the Crédé method was put in force. Not one single case occurred afterwards. The treatment gives rise to inflammation of the conjunctiva with an abundant thin muco-purulent discharge, commencing a few hours after the application; in nearly every case, however, this completely subsides in from four to five days, when the eyes regain their normal appearance.

EPIDEMIC INFLUENZA AND DRAINS.

BY AUGUSTUS H. BAMPTON, M.D. R.U.I.

THERE is considerable evidence accumulating of a nature to force one to the unpleasant conclusion that influenza has become endemic amongst us, and the assurance of epidemiological prophets that, as in former times, the epidemic would be only of three years' duration has been weighed in the balance of experience and been found wanting. To me it has always been a belief that influenza is as likely to be always with us as any other of the zymotic diseases. The problem I offer for solution to my professional *confrères* is, Where is now the lurking-place of the germs of this disease? I venture to suggest that the most probable habitat and favourable environment would be the drains. And my reasons for thinking so are based upon the facts that in badly drained houses I have noticed that first one member of a household and then another member are continually down with the complaint, and this in spite of isolation and disinfection; that where the drains have been made air-tight the attacks cease; also in well-drained houses influenza is absent. It may be urged that sewer air only renders the individual exposed to its baneful influence more susceptible to attack by lowering the general health. That may be true in part, but it does not explain away the influenza germ, nor does it help in the solution of the problem. In conclusion, where influenza never seems to be out of the house I say, "Look to the drains."

Ilkley.

A Mirror
OF
HOSPITAL PRACTICE,
BRITISH AND FOREIGN.

Nulla autem est alia pro certo noscendi via, nisi quamplurimas et morborum et dissectionum historias, tum aliorum tum proprias collectas habere, et inter se comparare.—MORGAGNI *De Sed. et Caus. Morb.*, lib. iv. Procemium.

UNIVERSITY COLLEGE HOSPITAL.

A CASE OF TORSION OF THE SPERMATIC CORD, WITH STRANGULATION OF THE TESTICLE.

(Under the care of Mr. A. E. BARKER.)

WE publish below the notes of another of the rare and interesting examples of strangulation of the testis due to twisting of the epididymis in which the symptoms were those of strangulated hernia. We have previously presented our readers with reports of similar cases under the care of Mr. Whipple, Mr. Bryant and Mr. Page, and have referred to others. A boy aged sixteen, under the care of Mr. Whipple[1] in the Plymouth Hospital, had sprained himself the day before admission, when a swelling in the left groin was present, and he gave a history of vomiting. The swelling was hour-glass shaped. "The lower half of this was the left testicle lying in the upper part of the scrotum; the upper, lying over the external abdominal ring, about the size of a hen's egg, was very tense, dull on percussion, and gave no impulse on coughing." In this case the epididymis appeared to be twisted twice on its own axis, and there was an omental hernia, the piece of omentum being attached to the testis. The testis was removed. Mr. Page's[2] case was that of a lad aged seventeen, admitted for urgent symptoms presumably in connexion with a right congenital inguinal hernia for which a truss had been worn. The symptoms commenced three days before admission, with severe local pain, tenderness and swelling. He vomited once and had constipation. The temperature was normal. Operation proved the symptoms to be due to gangrene of testis after twisting of the cord, two turns to the right, at the external ring. The open funicular portion of the peritoneum was closed by ligature and the boy made a rapid recovery. Mr. Bryant's case was that of a boy aged fifteen, who had been suffering from symptoms supposed to be due to strangulated hernia. Three half-twists made inwards completely untwisted the cord. The testis was not removed but afterwards wasted. Mr. Barker also reminds us of two others, one under the care of Dr. Keen (referred to by Mr. Bryant), that of a man aged twenty-three, the subject of an undescended testicle and reducible inguinal hernia on the same side. The cord had made three half-turns; the testis was removed. The other, under the care of Mr. Davies-Colley, was that of a boy aged fourteen, with undescended testicle but no hernia, in which the cord was twisted outwards three turns. The testicle was not removed, but the cord was untwisted. This testicle sloughed. We have purposely limited our references to cases in which the retained testis had become inflamed in consequence of a twist in the cord, and excluded those cases, much more common, in which an injury has produced the symptoms and in which no such twisting of the cord has been met with, although the symptoms produced were similar.

A healthy lad aged fifteen stated that the right testicle had been always small and had never fully descended into the scrotum, and that he had had a rupture on the same side since he was seven years old. This rupture disappeared until about one year ago and since then had usually been down to the top of the scrotum when he was in the erect position. He had never worn a truss. On March 2nd, 1893, the bowels were moved and soon afterwards the "rupture" came down as usual, but could not be reduced. He was at work throughout the nights of the 2nd and 3rd. On the latter day he was sick twice, but was at work again at night, although the swelling was increasing in size and becoming painful; he was sick twice again on the 4th. On the 5th[3] he took to his bed and remained there until admission into hospital on

[1] Reported by Mr. Nash: THE LANCET, May 16th, 1891.
[2] THE LANCET, July 30th, 1892.
[3] Under the advice of his medical attendant, Mr. Hereward Wake.

the 9th, the lump becoming more and more swollen and tender. On admission on the 9th he looked well; the tongue was dry along the dorsum and furred; the pulse was 96; temperature, 102·2°. The right testicle could be felt about two inches below the external abdominal ring, swollen many times beyond its usual size, which the patient described as about that of the last joint of the little finger. Above this there was a large oval swelling occupying the position of the inguinal canal and reaching nearly to the testicle. This swelling was hard and tender, and the skin over it was dark and œdematous. There was no abdominal tenderness. He had passed flatus every day since the onset, but the bowels had not been moved since the 2nd. Regarding the case as one of strangulated omental hernia, Mr. Barker operated at once in the usual way. On opening what appeared to be the sac of a hernia, just external to the ring, a quantity of bloody serum with some clots escaped, and a dark livid mass was exposed, smooth on the surface and very tense. At first this was regarded as a knuckle of strangulated intestine, but a few moments later it was recognised as the testicle twisted on the cord outwards three half-turns and consequently strangulated. There was no hernia down at the time. A twist of three half-turns inwards undid the strangulation, but as the organ was much damaged the cord was divided and the organ was removed. The canal was then stitched up and the wound was closed without drainage. The patient made an excellent recovery. The wound was left untouched until the ninth day, when union by first intention had taken place. Around two or three of the stitches the skin had slightly inflamed owing to the œdematous condition of the tissue at the time of operation. The temperature fell to normal after the latter.

Remarks by Mr. BARKER.—These cases are probably not quite so uncommon as the literature of affections of the testicle would lead one to infer, but have possibly been overlooked and treated as inflamed incarcerated herniæ in the past. I can find only four similar cases recorded, but have heard of others. Of the four appended almost all showed the same features. They all occurred in young individuals who had imperfectly descended testicles on one side. The symptoms closely resembled those of strangulated hernia—i.e., sudden onset, pain, vomiting, constipation and increasing swelling. Some were actually associated with hernia. The cause in more than one appeared to be an attempt to reduce the hernia, causing torsion of the testis or the cord. In all an operation was performed with recovery. In two the testicle was not removed, and in one of these it subsequently sloughed away; in the other, though the wound remained healed, the organ underwent complete atrophy. In Dr. Keen's case organisms were cultivated from a hæmatoma found round the epididymis. The proper treatment appears to be removal of the testicle in all cases and suture of the inguinal canal so as to radically cure the hernia. To leave the testicle in the scrotum after untwisting the pedicle would probably result in most cases, as in two recorded, either in atrophy of the organ or in its subsequent sloughing away.

YORK COUNTY HOSPITAL.

AMPUTATION AT THE HIP-JOINT FOR SARCOMA OF THE FEMUR.—STRANGULATED HERNIA WITH UNUSUAL SYMPTOMS.

(Under the care of Mr. JALLAND.)

THE case of hernia presents unusual characters, the symptoms being irregular and not unlike those met with in partial enterocele. The exact nature of the hernia is not quite clear, but from the description we incline to the opinion that it was a congenital one with a small opening, for intestine was felt and displaced from the neck of the hydrocele sac. The intestine was also slightly adherent, but how long it had been so it is not possible to say. How much disturbance may have been due to the escape of inflammatory fluid from the acute hydrocele into the peritoneum through the small opening, which was apparently blocked at the time of operation, is a matter of conjecture. There can have been no severity of strangulation, such as would have resulted in ulceration or sloughing of bowel, for the after treatment of the case was unmarked by complication.

The case of periosteal sarcoma of the femur illustrates the exceeding malignancy of these growths and the unsatisfactory result of the severe measure of treatment which at the present day is apparently the best at our disposal. It is not always easy to determine the nature of the disease from which the patient is suffering when complaint is made of the knee, especially if the disease commenced close to or has invaded the interior of the joint; and should the surgeon have come to a diagnosis as to the probable nature of the case and recommend exploration, to be followed by operation, it is difficult to make the friends understand that there is any urgency in the case, and that operation must not be delayed if even a moderate success is to be obtained. Continued experience only confirms the statement of Mr. Butlin, that amputations performed for this disease are very dangerous to life, rarely affording a permanent cure or giving long relief. Of thirty-six cases collected by him, in six the disease recurred in the stump, seven died of secondary disease, nine died from operation, ten were lost sight of, two died from unknown causes and the remainder were alive and well more than twelve months afterwards. Berck[1] collected 118 cases, recorded in the literature of disarticulation of the hip-joint for malignant disease of the thigh. Of these, 36 had been fully recorded and 27 died of secondary growth within from four weeks to four and a half years. He found no case of lasting cure. Mr. Rose has recorded a case in which after amputation at the hip there was no recurrence for five years. For the notes of these cases we are indebted to Mr. J. B. Lendrum, M.B., house surgeon.

CASE 1. *Sarcoma of the lower end of the femur; amputation at the hip-joint; recovery; subsequent death from secondary growth in the lungs.*—A girl aged sixteen was admitted into the York County Hospital on Oct. 6th, 1892, for what was supposed to be a white swelling of the right knee-joint. The history was as follows: The patient had been a stout, healthy girl of about eight stones in weight and had never suffered from any serious illness. In March last she began to feel an aching pain in the right knee. This pain went on for three months without any visible alteration in the joint, but then the knee began to enlarge and the pain to increase, being specially bad at night. Three weeks after the enlargement set in the patient fell on the knee. She was under treatment for tumor albus and in the latter end of August a Thomas's splint was applied and she took to her bed.

On admission the patient was a thin, cachectic-looking girl, very anæmic. On the right lower extremity was a Thomas's splint, the hip ring of which had to be filed through and bent to allow of its being taken off the limb. There was a large boggy swelling in the region of the right knee-joint, commencing gradually five inches above the centre of the patella and ending suddenly at the level of the tubercle of the tibia. This tumour was apparently arising from the lower third of the femur. The condylar portion of the femur was enlarged in all directions and the skin over the tumour was very discoloured—i.e., red-purple in patches over the outer posterior and inner surface of the joint. There was a slight softening on the inner side of the knee. Below the level of the tubercle there was great swelling and œdema of the leg and foot. The glands of the groin were slightly enlarged. The following were the measurements:—

	Right.	Left.	Difference.
From the anterior superior spine to the external malleolus tip	31½ in.	33 in.	1½ in.
Circumference 4 in. above the centre of the patella	18¾ in.	11½ in.	7¼ in.
Circumference at the level of the condyles	19¾ in.	11¾ in.	8 in.
Circumference at the tubercle of tibia	14¾ in.	10½ in.	4¼ in.
Circumference just above the ankle	10½ in.	8 in.	2½ in.

In five days after admission the circumference round the right knee increased ¾ in.; in seven days 1½ in. and in twelve days 2½ in. An exploratory aspiration was made, but only blood and some large round cells containing several nuclei were seen under the microscope. The patient's average temperature till operation was 99·6° F. and pulse 120. On Oct. 18th, under ether, disarticulation of the right hip was performed by the Furneaux-Jordan method. The temperature rose in eight hours after the operation to 102°, but in twelve hours it became normal and remained so. The first dressing was done four days after the operation, and then every five or six days for some time, when the wound had healed by first intention, excepting at the upper part of the perpendicular

[1] Annual of Universal Medical Science, 1891, vol. iii.

incision, where some serum from the joint continued oozing out; this eventually completely healed. The patient was quite well and able to leave the hospital by the middle of December, but stayed for Christmas to be present at the Christmas-tree entertainment.

Towards the end of December she had symptoms of pleurisy on the right side. The chest was tapped with a fine aspirator, but only a small quantity of blood-stained fluid was drawn off. From this time the girl began to fail, losing flesh, and the chest trouble was evidently spreading, the left side becoming affected, until she died on Jan. 24th, 1893.

At the post-mortem examination permission was only given to examine the chest. Both lungs were found to be infiltrated throughout with the growth, which also involved the pleura and the mediastinal glands. Under the microscope it presented the same appearance as the primary tumour, a very round-celled sarcoma, amongst which was interspersed some cartilaginous tissue.

CASE 2. *Strangulated hernia; operation; recovery.*—A man aged twenty-one was admitted into the York County Hospital on May 30th, 1892. He had been attended by a private practitioner, who had reduced a right inguinal hernia, but on examination I found a tumour in the inguinal canal still left. Three weeks before this the patient had had gonorrhœa. The bowels were moved six hours before admission.

On admission the right testicle was swollen and tender, there was a large swelling in the right side of the scrotum and the inguinal canal up to the internal abdominal ring. This was dull on percussion and no impulse was felt on coughing. The patient had been vomiting a bile-stained fluid before admission. On May 31st towards the evening sharp pain was felt in the right iliac region and across the abdomen. Vomiting occurred during the day of a copious quantity (about two pints) of bile-stained fluid containing what seemed to be intestinal casts of curdled milk enveloped in casein. The patient had not drunk two pints of fluid since admission. On June 1st he suffered most acute pain, and the sickness continued, with similar ejections; the bowels acted and flatus passed. The temperature rose in the evening to 101°. The next day the bowels acted again, some pain and sickness being complained of. The temperature in the evening was 99°. On the 3rd the bowels acted again and flatus passed. Temperature 98·2°. For the next two or three days there was no action of the bowels and things remained much the same. The swelling in the scrotum and in the inguinal region, which was diagnosed to be fluid, was decreasing. On the 5th the patient vomited twice a large quantity of peculiar pea-soup-like fluid after drinking some milk. No action of the bowels had taken place since the 3rd, but flatus was passed daily. During the night of the 6th the patient vomited five times, the vomit being distinctly fæcal in character, and when the nurse was out of the ward he walked to the closet, when the bowels were slightly moved. The abdomen was very swollen and the pain very acute.

On the 7th Mr. Jalland, in the middle of the day, the patient being under ether, cut down upon the swelling in the inguinal canal, which proved to be, as was expected, an acute hydrocele of the tunica vaginalis, extending almost up to the abdominal ring, and an enlarged testicle, but no bowel was contained in it. At the upper limit, however, the finger could just feel a small piece of bowel, evidently only a portion of the calibre of it, which with very little pressure vanished into the abdomen. This was thought to be the hernia, as nothing else was found. The wound was stitched up and a small drainage-tube introduced into the lower end. After the operation the same day, the bowels were moved five times. During the next day the temperature rose to 102·6° and three motions were passed. In three days the temperature became normal, the wound was dressed and found to have united by first intention except at the site of the drainage-tube, which was then removed. During the next seven days the symptoms had all abated, the wound was comfortable, the bowels were moved once by an enema. On June 17th great pain was felt round the umbilicus, and the patient could not straighten his legs on this account, but lay with his knees drawn up. Next day, after an enema, the bowels were moved and the temperature then rose to 101°. He then had diarrhœa for one day, after which the temperature fell and the patient made an uninterrupted recovery, only marred by a slight febrile attack on each attempt to increase the diet. He got up on July 12th and left the hospital quite well on July 17th.

Medical Societies.

ROYAL MEDICAL AND CHIRURGICAL SOCIETY.

Resection of Intestine and Immediate Suture in Cases of Gangrenous Hernia.

AN ordinary meeting of this Society was held on March 28th, the President, Sir Andrew Clark, in the chair.

Mr. KENDAL FRANKS read a paper on Resection of the Intestine and Immediate Suture in cases of Gangrenous Hernia. He related the case of a woman aged thirty who had an umbilical hernia of three months' duration. It became strangulated on Sept. 22nd, 1891. Thirty hours and a quarter afterwards herniotomy was performed. The abdomen was found to be full of gelatinous fluid associated with an ovarian tumour. The loop of intestine proved to be gangrenous. Nine inches and a quarter were excised and the ends of the intestine immediately united by means of Gily's suture. The abdominal cavity was closed, and a glass drainage-tube inserted, but was removed on the fourth day. The bowels acted regularly after the fifth day and recovery was complete. Five weeks later the abdomen was again opened, and the ovarian multilocular semi-solid cyst was removed. The sutured intestine was inspected. The union was perfect; the line of union could be felt as a thickening in the gut, but could not be detected by the eye. Mr. Franks discussed (1) the co-existence of ascites with strangulated hernia, and (2) the treatment of gangrenous hernia. The various methods of treatment were reviewed, and the following were some of the conclusions arrived at. Gangrenous hernia might be treated on one of two principles, either by resection and immediate suture or by the formation of an artificial anus. The latter necessitated a secondary operation for its cure, either by the use of Dupuytren's enterotome, or by secondary resection and suture. To estimate the relative merits of these two principles of treatment, the death-rate of immediate resection and suture must be compared with the death-rate following the formation of an artificial anus, *plus* the death-rate of the secondary operation required for its cure. The death-rate in cases of gangrenous hernia treated by the formation of an artificial anus was 80·7 per cent. The death-rate of secondary resection and suture for the cure of artificial anus was 38 per cent. The death-rate following the use of the enterotome was 7·3 per cent. The mortality which attended resection and immediate suture in gangrenous hernia was shown in a table, presented to the Royal Medical and Chirurgical Society, of 220 published cases to be 48 per cent. Mr. Franks concluded that intestinal resection and suture should be the operation of choice in gangrenous hernia, and that simple enterotomy, followed by the formation of an artificial anus, should be reserved for absolutely special cases and should be considered as an exceptional procedure.

Mr. JONATHAN HUTCHINSON, jun., mentioned a case of a woman aged forty who had had a strangulated hernia for three days. On opening the sac he found the included portion of the gut gangrenous, and there was commencing peritonitis. He then opened the abdomen in the middle line removed altogether twelve centimetres of the intestine, and having taken care to be well away from any damaged portion. The piece removed was shown to the Society and exhibited clearly where the gut had been gripped in the strangulation and some two inches on either side. He had not found clamps of much use, and preferred the fingers of an assistant for this purpose. He had used a continuous suture for the mucous membrane and Lembert's suture of fine silk for the rest of the wall in joining the ends of the intestine together. The sac was removed at the first opening and so a radical cure was performed. The patient made an uninterrupted recovery. In this case, although no taxis had been attempted, inflammatory changes above the seat of the stricture had set in. The mucous membrane was ulcerated quite through and there was commencing peritonitis. One question in these cases was whether the section through the intestine should be oblique in order to prevent stricture. In his opinion this was not necessary. Another question was whether the resection should be performed at the site of the hernia or through a second opening in the middle line. He was in favour of the

latter plan, as after suture the thickness of the gut was increased, and it might be difficult or even impossible to return it through a femoral or even through an inguinal ring.

Mr. LOCKWOOD said that surgeons up to the present appeared to have been averse to accept resection, their objection being based on statistical grounds. He agreed with Mr. Franks that resection was an ideal operation. He preferred resecting the intestine through the original wound and cutting through Poupart's ligament if there was any difficulty in replacing the sutured gut. He considered that method of suture the best with which the surgeon was most familiar.

Mr. A. E. BARKER emphasised the importance of removing enough mesentery and intestine to insure having healthy tissues to suture together. He preferred to resect through a median incision, as greater freedom for manipulation of the mesentery and intestine was allowed. The plan that he advocated was to remove all the gangrenous parts through the hernial wound and to close temporarily with ligatures the ends of the intestine and then resect them through a median incision. With reference to statistics, he suggested that when an artificial anus was made the cases were very desperate, enterectomy being performed in the more favourable ones.

Mr. BOWLBY agreed with the position that Mr. Franks had taken up, though he thought that he had perhaps taken a too favourable view of the operation. From statistics gathered from St. Bartholomew's, Guy's and St. Thomas's Hospitals by Mr. Berry over a period of ten years, it appeared that the mortality for all cases of strangulated hernia operated upon was 44 per cent. on 946 cases. The statistics for St. Bartholomew's Hospital, which he had himself collected, showed a mortality of a little over 40 per cent. Mr. Franks' statistics for resection were almost as good and the explanation of this was probably that unfavourable cases had not all been recorded. It was remarkable how many times some of the surgeons mentioned by Mr. Franks had performed this operation of resection, as out of the enormous number of cases of hernia admitted into St. Bartholomew's Hospital in the last ten years, in only forty-two was the intestine gangrenous. It might be inferred, therefore, that resection had occasionally been performed in cases in which the intestine was not gangrenous.

Mr. THOMAS SMITH agreed with Mr. Bowlby that the term "gangrenous" conveyed a different meaning to different operators. The great obstacle to the operation was the depressed condition of so many of the patients, which rendered them unsuitable subjects for so prolonged an operation. He did not approve of the use of Senn's plates in these cases. He added that in every case of artificial anus a further operation was not always needed, as occasionally they tended to recover without interference.

Mr. CLEMENT LUCAS said that in resection in cases of femoral hernia one question which would have to be settled sooner or later was whether the operation should be completed at the seat of the hernia or through a median incision.

Mr. FRANKS, in reply, stated that he had found the fingers of a capable assistant to be the best form of clamp; that an oblique section was the proper one and that more should be taken from the convexity than from the concavity; and that if the condition of the intestine was doubtful it was better to remove the doubtful part than to risk returning a gangrenous portion into the abdomen. A plan adopted by German surgeons was to fasten the doubtful portion to the abdominal wall and to watch it for twenty-four hours, and then to resect or return it according to circumstances. He said that apparently large pieces of intestine could be removed without doing any harm to the patient and without increasing the risk, but that it was very dangerous to leave or suture any unhealthy tissue. In cases of femoral hernia he preferred to open the sac and to clean the parts and then to resect them through a median incision. With regard to sutures, he had always adopted Gily's plan up to the present, but in future intended to use the continuous method. The mortality was probably about 56 per cent., which was much lower than in cases of artificial anus. He referred to a case of colectomy for malignant growth which he had published in the Society's Transactions for 1889, and stated that the patient was at the present time alive and well.

The PRESIDENT observed that the duration of time needed for the operation of resection had not been, he thought, adequately discussed, and that, from a physician's point of view, it was a very important one.

OTHER METROPOLITAN MEDICAL SOCIETIES.

HARVEIAN SOCIETY OF LONDON.—A meeting of this Society was held on March 23rd, Mr. Malcolm Morris, President, in the chair.—Dr. H. A. CALEY read a paper on a case of Simple Ulcerative Colitis, the patient recovering after a long illness. It presented severe constitutional symptoms, those of toxæmia and exhaustion, together with local symptoms (tenderness, bleeding, diarrhœa), clearly referable to extreme ulceration of the large intestine.—Dr. SIDNEY PHILLIPS said that six cases had come under his own observation at the bedside or in the post-mortem room. There might be no melæna throughout, though the intestine was deeply ulcerated and perforations had occurred. Perforation might take place with no pain or signs of collapse, and fæces might pass into the peritoneal sac for days before death.—Dr. SOLOMON SMITH said that in his experience milk, in consequence of the copious stools to which it gave rise, was far from being a form of diet which gave rest to the colon. It appeared to him that in cases of ulceration hæmorrhage was far more likely to be produced by stretching and distension of the intestine by the gases of decomposition than by mere movement.—Dr. ALDERSON stated that in cases occurring in children he had found nitric acid with very minute doses of opium useful.—Dr. BOXALL remarked that ulcerative colitis was the main feature of mercurialism occurring as the result of sublimate douching in obstetric practice. The symptoms present in most of the cases which had come under his notice were abdominal pain and distension, diarrhœa, tenesmus, with mucus and blood in the stools, and little or no fever; but the more generally recognised evidences of mercurialism, such as salivation, loosening of teeth, line on the gums and metallic taste, were usually either entirely absent or but slightly pronounced. It was highly essential to bear this in mind and on the first indication of symptoms to stop the use of the mercury, to prevent further absorption and to promote speedy elimination. He had been present at the necropsy of two cases in which mercurial douching had been persisted in under the impression that the symptoms betokened septic poisoning. On examination the colon was in each case found to be inflamed and studded with numerous ulcers, especially in the region of the ileo-cæcal valve, and in one spot in the more advanced case was actually necrotic and bordering on perforation.—Mr. PEYTON BEALE asked whether any bacteriological examination had been made.—Dr. CALEY replied.—Mr. TREVES discussed the Pathology of Typhlitis and certain points in its clinical aspect. He pointed out that the majority of cases of typhlitis recover under medical treatment and that only a certain proportion of the cases of relapsing typhlitis call for operation. Before operating in the relapsing form one or other of the following conditions should be present: (1) The attacks are numerous; (2) they are increasing in frequency and severity; (3) the last attack has been alarming; (4) the patient is rendered an invalid; (5) there is evidence of pus about the vermiform process; (6) in every case the enlarged appendix should be capable of being demonstrated during the quiescent period. Mr. Treves then described the details of the operation and concluded by giving a description of fourteen cases of removal of the appendix for relapsing typhlitis which had been under his care, all of which recovered.—Mr. EASTES considered that the cases usually seen by the members of that Society were of a less serious character than those described by Mr. Treves, but that the treatment required for those milder cases was equally definite and should consist of absolute rest in the recumbent posture, semi-starvation, liquid diet alone, and the use of an opiate with some belladonna to prevent constipation.—Mr. CRIPPS LAWRENCE mentioned having treated cases, one some six years ago, with anti-rheumatic remedies, with marked benefit. In an experience of some years, including a fair proportion of cases of typhlitis in various forms, he could not recall any that had necessitated operation.—Dr. SOLOMON SMITH, Dr. SIDNEY PHILLIPS, Dr. WILLIAM HILL and Mr. HUBERT PHILLIPS also took part in the discussion.—Mr. TREVES replied.

ISLINGTON MEDICAL SOCIETY.—At the last meeting of this Society Dr. ALEXANDER MORISON read a paper on the Causes and Treatment of Dilatation of the Heart, in which he con-

sidered (1) the relation of the nervous system to the condition under consideration; (2) the conditions of the heart itself as to (α) its mechanical efficiency, (β) its nutrition, (γ) its contents—the quality and quantity of the blood; (3) the influence of the extra-cardiac vascular system—systemic, arterial, venous and pulmonary; (4) the influence of diaphragmatic and general muscular activity and the retardation of these important functions by obesity; (5) the influence of extra-corporeal conditions and agents—namely, (α) atmospheric pressure, its diminution and increase, and also the effect of variations in temperature, (β) the influence of accidents, including shock; (γ) the effect of improper quantity in food and drink; (δ) the influence of drugs. From the limited time at his disposal Dr. Morison naturally dealt cursorily with several of these topics, but emphasised the importance of the nervous factor in these cases and discussed at length the importance of the coronary blood having a maximum oxygenation. He considered heart-failure from nerve influence to be at least of two kinds—namely, (1) vagus inhibition from gastro-intestinal contraction or emotional shock; and (2) exhaustion of the cardiac reflex centre from sustained over-action of the heart due to disease or undue exertion. Amongst other points of treatment he discussed the views of Dr. Oertel of Munich.

MIDLAND MEDICAL SOCIETY.

MEETINGS of this Society were held on Feb. 8th and 22nd at the Medical Institute, Birmingham, Mr. Eales, President, being in the chair.—Mr. WOOD WHITE showed a woman aged thirty with a Sarcoma growing from the periosteum of the inner wall of the orbit and the side of the nose. Two months before her admission to the Eye Hospital a discharge was noticed from the nose on the same side, and examination showed that the upper part of the organ was occupied by a soft spongy and vascular growth.—Dr. PURSLOW showed a Multilocular Ovarian Cyst which he had removed by abdominal section from a woman aged forty-six at the Queen's Hospital. The tumour had been noticed for four months and at the time of operation was about the size of the uterus at term. A median incision three inches long was made, the larger cyst was evacuated by the trocar, and several smaller cysts were broken up by the trocar and finger and the mass withdrawn from the abdomen. The fluid measured 169 oz., and the remaining part of the tumour weighed 31 oz. No flushing or drainage-tube was used, and the patient made an excellent recovery.—Dr. MALINS showed (1) a large Hæmatosalpinx and (2) a Dermoid Cyst of the Ovary. He also exhibited a Myeloid Sarcoma of the Humerus with spontaneous fractures from the arm of a boy aged ten years. Two years ago he fell and fractured his humerus; the year following he fell and fractured it again; and six months ago he again fell and injured his arm. Since the first injury he had always noticed a lump in his arm, but it did not increase in size until after the last one. This specimen raised the question as to whether the sarcoma was the result of the various injuries, or whether the fractures were secondary to the new growth.—Mr. HASLAM read a paper on the Value of the Ligature of the Lingual Arteries in Malignant Disease of the Tongue.—Mr. THOMAS exhibited a boy, aged twelve, who had an Ununited Fracture of the Right Clavicle. When about a year and a half old his clavicle was fractured by an accident, but he was treated at one of the hospitals; non-union seemed to have resulted. The following was the present condition: The right clavicle had been fractured a little externally to the centre. The fractured ends could be readily separated and moved, but in a state of rest the outer fragment lay below and in contact with the inner for nearly an inch; there was well-marked fibrous union between the fractured ends. The shaft of the clavicle was atrophied, but the muscles of the shoulder, and especially the deltoid, were much hypertrophied. Any kind of movement of the upper extremity could be performed with ease and quickness. As such complete use of the arm was acquired Mr. Thomas had given up the idea of any further operative proceedings.—Mr. MARSH showed a youth aged twenty, the Right Lobe of whose Thyroid Gland, with the central part, he had excised three weeks before for acute bronchocele, causing dyspnœa. The enlargement of the neck had only been noticed four months prior to admission into hospital on Feb. 2nd. There were no cardiac symptoms or exophthalmos, but the veins on the right side of the neck were distended. A median incision was employed and the patient made a rapid recovery.—Mr. WOOD WHITE showed for Dr. SUCKLING a woman aged forty-two, suffering from Paraplegia supervening upon Exophthalmic Goitre. Dr. Suckling considered that descending sclerosis of the motor tracts had followed upon a lesion in the region of the floor of the aqueduct of Sylvius.—Mr. WOOD WHITE showed a boy aged six with a firm, elastic and fairly movable Tumour growing from the upper part of his right orbit and bulging the upper eyelid. The growth was first noticed six months previously, and, three months before admission to the Eye Hospital, was removed at another institution. It recurred very rapidly, and Mr. White had no doubt that the tumour was a sarcoma; he contemplated its removal at once, sparing if possible the eyeball.—Dr. SHORT showed a man aged sixty-two who during the last eighteen months had passed two large Gall-stones, weighing respectively 309 grs. and 214 grs., at an interval of eight months. A review of the symptoms made it most probable that the stones had ulcerated from the gall-bladder into the hepatic flexure of the colon. The first calculus was perfectly smooth and the second was faceted at each end.

Reviews and Notices of Books.

Text-book of the Embryology of Man and Mammals. By Dr. OSCAR HERTWIG, Professor Extraordinarius of Anatomy and Comparative Anatomy, Director of the Second Anatomical Institute of the University of Berlin. Translated from the Third German Edition by EDWARD L. MARK, Ph.D., Hersey Professor of Anatomy in Harvard University. Pp. 670, with 339 Figures in the Text and 2 Lithographic Plates. London: Swan Sonnenschein and Co. 1892.

DR. MARK has done good service to the student in translating this valuable treatise into English. Although in Balfour's great work, in Foster's Embryology and in Haddon's work the main facts in development are placed within the reach of the morphologist and the physiologist, room still remained for such a *résumé* of the whole subject as that before us. Balfour's treatise is now twelve years old, and much has been done in the way of observation and many improvements in the means of staining have been effected in the interval. Foster's excellent little manual is chiefly concerned with the fowl. Haddon's text-book is short, and also restricted in its scope. Hertwig is himself known as an original worker, and the reader will find in these pages a fairly full and satisfactory account of all that has been done in this department of science up to the spring of 1890. The translator must have worked hard to have completed his translation in the course of a year and a half, especially as the rendering of the German is all that could be desired in clearness and accuracy.

The work is divided into two parts, the first of which deals with the early stages of development of the ovum, whilst the second part is occupied with the development of the organs. The earliest changes that take place in the unfecundated egg or those accompanying maturation of the ovum, as the translation of the germinative vesicle from the centre to the surface, the shrivelling of the vesicle coincidentally with the escape of fluid from its interior, the disappearance of its nuclear membrane and the breaking up of the germinative clot, and finally the formation of the nuclear spindle and the extrusion of the polar cells or direction globules, are all carefully given. The author was himself the first to point out that a distinction must be drawn between the nucleus of the immature, the mature, and the fertilised egg, or in his nomenclature between the germinative vesicle, the egg nucleus and the cleavage nucleus. He remarks that, although the researches on the phenomena of maturation still present numerous gaps, it may, nevertheless, be held "that eggs with a germinative vesicle are

never capable of fertilisation, that the germinative vesicle is without exception dissolved, and that there is formed out of its components a very small egg nucleus." During the change polar cells are extruded. In regard to these polar cells no satisfactory explanation has been advanced, but he notes the discovery by Weismann and Blochmann that in eggs which are developed parthenogenetically only a single polar cell arises. By some these cells have been considered to be male constituents of the original hermaphroditic egg, which are thrown out, to be subsequently replaced by fertilising germinal elements of the male. Hertwig himself, however, inclines to the opinion that the ovum was originally capable of dividing into many cells or eggs, and that the polar cells are really abortive eggs.

A very interesting section is devoted to the history of the vertebral theory of the skull. The attempt to solve the problem of the composition of the skull was made by Oken and Goethe, the former of whom recognised three vertebræ in this part of the skeleton, which he named respectively the ear, eye, and jaw vertebræ, and he and Goethe pointed out the general similarity that exists between a vertebra and the occipital bone; whilst an effort was made to show a similar analogy between a vertebra on the one hand and the posterior body of the sphenoid, with its greater wings and the parietal bone, on the other, the third cranial vertebra being represented by the anterior portion of the body of the sphenoid and the lesser wings of the sphenoid and the frontal bone. Even a fourth cranial vertebra was recognised in the ethmoid bone. In this form, as Hertwig observes, which underwent numerous modifications in details, the Oken-Goethe vertebral theory of the cranium dominated morphology for decades and formed the foundation of many investigations. "It had a stimulating and fruitful effect until with a deeper insight into the structure of vertebrates it was abandoned as defective and erroneous, giving way before the force of numerous newly discovered facts." Owen, who devoted so many months or years to this subject, is not even mentioned. Huxley first ventured to attack the view, which threatened to become an accepted one, on embryological grounds, maintaining that not a single cranial bone can be recognised as a modification of a vertebra; that the skull is no more a modified vertebral column than the vertebral column is a modified skull; that, rather, both are essentially distinct and different modifications of one and the same structure. Gegenbaur next, taking up the subject where Huxley had left it, produced evidence, also derived from embryological research, that the primordial cranium has arisen by fusion from a number of segments, these segments being equivalent to but not modifications of vertebræ. He dwells upon the arrangement of the chief nerve trunks, and holds that there are in the cranium nine pairs of segments which early fuse together, but whose original separation is still indicated by the passage through them of the nine segmentally arranged cranial nerves. Hertwig then proceeds to give his own views on the points in dispute.

The long discussion in regard to the origin of the *ossicula auditûs* seems to be in a fair way of settlement, the incus and malleus being segments of the proximal portion of the rod which is familiar to all as Meckel's cartilage, whilst the stapes appears to have a double origin, the plate which fits into the fenestra ovalis being differentiated, as Parker maintained, from the cartilaginous capsule of the labyrinth, and therefore corresponding with the operculum of the amphibia, whilst the arches proceed from the upper end of the second visceral or hyoid arch which lies in contact with the capsule of the labyrinth, the ring-like form being due to the circumstance that the tissue from which it is formed is traversed by a small branch of the carotis interna, named the "arteria mandibularis or perforans stapedia." The malleus and incus therefore belong to the first visceral arch and the stapes to the second, and this view is supported, as Rabl has pointed out, and as is admitted by Hertwig, by the fact that the muscle of the stapes is supplied from the nerve of the second visceral arch, the nervus facialis; whilst the muscle of the malleus receives a branch of the trigeminus, which is the nerve of the mandibular arch.

The difficult and obscure subject of the development of the bloodvessels and of the blood, on which the last word has been by no means said, is well handled, and the conflicting views of Kölliker and his adherents, that they arise from the mesoblast, and of Rückert-Swarn and, it might have been added, of Corning, that they are primarily derived from the cells of the hypoblast, are clearly given on the whole. The author does not consider the question of the source of the cell layer, in which, in the region of the opaque area, the formation of blood takes place, as ready for final judgment; but as regards the further changes by means of which the cell layer under consideration is converted into connective tissue and blood he adheres to Kölliker's views. To several of the chapters a historical appendix is added which is in every instance valuable, giving an admirable account of the mode in which the views at present held have been evolved from the looser statements of the older observers and writers. In conclusion, the work may be taken throughout as an authoritative exposition of the present state of our knowledge of embryology.

Bibliothèque Photographique: La Photographie Médicale. Application aux Sciences Médicales et Physiologiques. Par ALBERT LONDE. Paris: Gauthier-Villars et Fils. 1893.

MOST of those who have followed M. Charcot's publications are by this time well acquainted with the admirable photographic representations he introduces in order that he may add to the value of his descriptions, and have also recognised that these photographs can only be the result of most careful study and of the application of an almost perfect technique. We have now in our hands a most admirable manual on medical photography by M. Londe, Directeur du Service Photographique à l'Hospice de la Salpétrière, in which are combined both descriptions of methods and of apparatus and very fine examples of the art that he describes. The work is very complete not only in the fact that it gives all this information, but also in that it indicates very clearly to what extent photography may be called in to assist in making permanent records of medical observations—in the term "medical" must also be included "physiological" records, for of the examples and plates given some of the most admirable are those made to record physiological experiments. To indicate the lines on which the author proceeds we may merely give an example. All who have worked at photography of special limbs and features know how difficult it is to ensure the hand, for instance, being perfectly still whilst a photograph is being taken; in some cases it is impossible, in others it may be managed comparatively easily. In the former instances M. Londe simply takes photographs, first instantaneously, and then gradually increasing the length of exposure, knowing the exact exposure in every instance. He is thus able to determine at what rate movements are taking place, through what range these movements go on, and by the distinctness of the different images of the moving hand to determine which movements occur most frequently. Where it is possible to keep the hand at rest this is done by placing the thumbs together where the back of the hand is to be reproduced, and the little fingers together where the palm has to be reproduced, resting them on a kind of sloping desk in front of the patient. In this way the most minute details may be brought out very distinctly, the photographs serving in some instances the purpose even of a delicate cast. A few other examples may be mentioned—viz., plates illustrating deviation of the vertebral column in the case of

syringomyelia; the positions and movements of patients suffering from paralysis agitans; the position of the head in cases of hysteria; appearances of the features in acromegaly and paralysis agitans; the appearance of the feet in acromegaly and in cases of epilepsy; the rhythmical movements seen in chorea; a series of photographs of the effects produced by faradaic currents on certain of the facial muscles; the phases through which an epileptic passes; the photograph of epileptic walks and of rapid movements; specimens of reproduction of writing; anatomical photographs, such as those of the brain and of sections of the spinal cord; of various forms of cultures; of the hands of different artisans, showing the special features by which these are characterised; and of other medico-legal subjects. The photographing of microscopic specimens and of test-tube cultures is also mentioned, whilst the treatment of negatives, the preparation of positives for lantern work, the preparation of mechanical prints, of gelatine printing plates and the like, complete the work, which is one that should be in every hospital and in the library of every laboratory.

Mineral Springs and Health Resorts of California. By WINSLOW ANDERSON, M.D., M.R.C.P. Lond., M.R.C.S. Eng., Joint Editor of the *Pacific Medical Journal*. San Francisco: The Bancroft Company. 1892.

THIS work is a prize essay which obtained the annual prize of the Medical Society of the State of California for the year 1889. The writer has personally visited the prominent mineral springs and health resorts of California and has satisfied himself that this State possesses "as valuable mineral springs as any to be found in the world" and "that all that is needed to make them as serviceable in the restoration and maintenance of health as their famous sister springs in the East and in Europe is their further development, their chemical analysis and the scientific administration and application of their waters." The author, after obtaining analyses of every European and American spring of any note, has applied himself to the task of analysing the Californian waters and comparing the results. He is of opinion that "the Californian waters compare favourably with those of the European and Eastern States; in fact, many of them are almost identical in composition." The work contains the names of over two hundred Californian springs, with about one hundred analyses, besides two hundred analyses of all the famous springs in America and abroad. Short sketches are introduced on the fertility and natural productions of California, its history, climate, rainfall &c, and there are also comparative thermometric tables. The work is profusely illustrated, the illustrations being fairly well executed, but for the most part such as we are accustomed to more in a book of travels than in a scientific work. Writers on climate, meteorology, balneo-therapeutics and kindred questions are beset with the difficulty that the materials for scientific precision with regard to these important subjects hardly exist and the temptations to flowery description and "tall talk" are very strong. Dr. Anderson makes laudable efforts to collect as many scientific data as possible, and his tables of analyses of Californian springs are much the most complete with which we are acquainted, but he repeatedly wanders off into enthusiastic panegyrics upon "the golden west," "the balmy luxuriance" of the climate &c., and he studs his pages with poetical extracts, often of rather hazy eloquence.

The most striking feature of the Californian springs is their variety. Amongst the hundred springs of which the author supplies analyses examples are found of all the chief varieties of spa. Alkaline and alkalo-carbonated springs are numerous. One of these—Etna Springs—has a composition closely resembling that of the Ems waters, both containing chloride and carbonate of sodium and carbonate of magnesium and calcium. Light carbonated waters, either simply mildly alkaline or containing small quantities of iron or sulphur, are found at Aqua de Vida, Allen Springs and elsewhere. Stronger ferruginous and sulphurous springs abound. At Anderson Springs in Lake County are found mild alkalo-sulphuretted waters, mild chalybeate waters, springs containing free sulphuric acid, light salino-sulphurous waters, a magnesian spring rich in Epsom salts and a hot sulphurous spring used for bathing. This variety of waters in a single locality is typical of the wealth of California in mineral springs. Borax springs are amongst those most characteristic of the country. They are found in various parts of the State. The author informs us that during the last twenty years California has produced $5,000,000 worth of borax. Moor or mud baths in association with hot saline and sulphur waters are found at Byron Springs, in Contra Costa County, about sixty-eight miles north-east of San Francisco. This seems to be one of the most notable of the Californian spas, containing more than fifty springs, some hot, others cold, carbonated, saline, sulphurous, chlorinated &c. We have not space to follow the author through his description of these and other springs.

There can be little doubt that a great future lies before California as a sanatorium. It possesses three grand requisites for such a purpose—viz., a very fine climate, great natural beauty, and great wealth of mineral waters. Of the climate much has been written, and, in spite of the occasional extravagances of enthusiastic writers, we may fairly admit that its merits entitle it to rank amongst the best climates in the world. The most favoured part is probably that constituting the littoral and adjoining regions from Monterey to San Diego. Whilst admitting that the enthusiasm of writers on California has very solid foundations in fact, we would counsel such writers to give us a little less eloquence and a little more of accurate and well-sifted scientific data.

Ueber Echinokokkus der Pleura und die ihn vertäuschenden Localisationen der Echinokokkenkrankheit. Von Professor Dr. CARL MAYDL. Wien: Verlag von Josef Safár. 1891.

DR. CARL MAYDL, in his monograph on echinococcus of the pleura, gives a fairly complete account of this comparatively rare disease. He supplies workers with abstracts of statistics and pathological records collected by various observers who have come across cases, and from his remarks on these we gather that he considers the prognosis exceedingly bad unless operation be resorted to. He gives very good tables for diagnosing solid from cystic tumours and intra-thoracic echinococci from pleuritic exudations. He points out that in the former case the pain is longer continued and that it is not so strictly localised; that the dyspnœa is much more marked and leads to far graver results; that the expansion of the thorax is more irregular and also more circumscribed; that the dulness of percussion is localised and that it is not specially marked at the lower and posterior part of the chest; also that there is no well-defined "water-line" of such dulness, that it may extend to the opposite side of the chest without filling up the whole of one side, that the respiratory murmurs are completely lost, that bronchophony and ægophony are absent, that there is little fever, but that in the later stages of the disease there is great cachexia, anæmia and emaciation.

As regards the treatment, the author evidently believes in puncture with or without the injection of iodine, though he seems to prefer simple operation with the use of antiseptics. He points out that it is, of course, often necessary to incise and even to remove some of the ribs in order to obtain the best results. In fact, he seems to think that, the more radical the treatment (taking the nature and the extent of the disease into account), the better will it be for the patient.

LIBRARY TABLE.

The Veterinary Journal. London: Baillière, Tindall and Cox.—The March issue of this journal contains a number of interesting papers, amongst which we may note an article by Professor De Jong on Sarcoptic Scabies in the Fox, the first time this disease has been described in this animal in England; another on the Castration of a Cryptorchid Horse, the operation being rendered more difficult by the presence of a serous cyst in the testicle, but the obstacle was successfully surmounted by Professor Degive, who is the director of the Brussels Veterinary School. There is also a valuable contribution to the subject of protective inoculation for swine plague from the pen of Professor Barker of the Patho-Biological Laboratory of the Nebraska State University. Mr. Pyle of Cleveland, Ohio, describes a new malady of cattle, known in the States as the "corn-stalk disease," which appears to be due to eating maize stalks late in the autumn. The cause of the disorder, which is of a rather serious character, is reported to be a vegetable parasite—a belted germ which is neither a coccus nor a bacillus, though much resembling these in form. Mr. Hoare gives a case of tuberculosis in the dog complicated with ascites, and Professor Leclainche, of the Toulouse Veterinary School, continues his essay on Influenza in the Horse. Altogether the number of this periodical is an excellent one and contains much that is instructive to the pathologist.

Lehrbuch der Speciellen Chirurgie für Aerzte und Studirende. Von Dr. FRANZ KOENIG, Ordentlicher Professor der Chirurgie, Geheimer Medicinal-Rath, Director der Chirurgischen Klinik in Goettingen. Sechste Auflage. Band I. Berlin: August Hirschwald. 1893.—This text-book of regional surgery is too well known to need any but a brief notice from us. The author has made a careful revision of this, the sixth, edition. The second volume is in the press, but it was thought better to issue the first at once and not to keep it back for its fellow, as originally intended. This volume includes the sections devoted to the injuries and diseases of the head, face and neck. The text is illustrated with 139 wood engravings.

Analytical Records
FROM
THE LANCET LABORATORY.

NON-IRRITATING NURSERY POWDER.
(C. H. GRIFFITHS OPENSHAW.)

THE composition of this powder according to our examination is simple. It is perfectly free from irritants, is entirely soluble in hot water and contains a well-known and mild antiseptic. The preparation is made attractive by the delicate and fragrant odour of rose extract.

ESSENCE OF BEEF AND CONCENTRATED BEEF-TEA.
(BRUCE & CO., LIMITED, ST. GEORGE'S HALL, WALHAM-GREEN, S.W.)

Portable and concentrated forms of food are useful and valuable in their way, but they cannot be regarded as being always fitted to replace the freshly prepared products. Whilst a desirable degree of concentration of the nutritious and stimulating elements is effected flavour is often sacrificed, and the process may not improbably affect the digestibility of the constituents. We have examined from time to time a great number of concentrated foods, notably beef extract and essences, which, similar to the above, are more or less satisfactory as regards flavour and degree of concentration; but, whilst many of them contain in large proportion the stimulating principles of the meat from which they are obtained, certain of them are found to be nearly if not quite destitute of the really sustaining and nutritious elements fibrin and albumen. This does not apply, according to our examination, to the concentrated beef-tea of the above firm, although we cannot agree that fibrin and albumen, and especially the former, were present in large proportion. This preparation would certainly be improved and be all the more valuable as a food if it contained more of this substance. In regard to the merely stimulating constituents of beef, however, it is highly satisfactory. Thus it contains 63·87 per cent. beef extractives, no less than 10·96 parts of which are nitrogen; whilst the mineral matter, rich in soluble phosphate, containing also common salt, amounted to 6·02 per cent. It yields a pleasantly tasting and agreeably saline liquor when dissolved in warm water. The essence is a clear amber-coloured jelly which, on analysis, was found to have the following composition: Moisture, 90·23 per cent.; extractives, 8·79 per cent., containing 1·65 parts nitrogen; mineral matter, 0·98 per cent., consisting almost wholly of soluble phosphate. It contains, therefore, the soluble constituents creatin &c. of beef. The taste of its solution is somewhat insipid unless salt is added. Both preparations, it is satisfactory to add, are free from injurious preservatives.

HARVEST'S LENTIL FOOD.
(W. & D. HARVEST, LONDON, E.C.)

The high amount of nitrogenous matter in the lentil has brought this pulse food into favour; but the taste of the lentil does not appeal to all palates, and hence many excellent preparations are made, of which the above is a type, in which the flavour of the ground lentil is improved and made attractive by incorporating with it other ingredients without detracting from its food value. The taste of the above preparation is good, though somewhat saline. It is well suited for the preparation of soups, porridges and other forms of food. Lentil was the only form of starch that was recognised under the microscope.

DR. LANGEN'S SUGAR OF MILK.
(BURROUGHS BROS, 66, BASINGHALL-STREET, E.C.)

It is an accurate statement, we find, that this preparation is chemically pure. It dissolves completely in hot water and yields absolutely no mineral matter on incineration. Analysis gave figures which approximated to 100 per cent. real lactose, calculated on the dry product. Its uses are manifest. We must again protest against the name of a medical practitioner being made use of in the title of this or any other preparation.

PUREST ETHYLIC ÆTHER.
(SALAMON & CO., LIMITED, RAINHAM, ESSEX.)

We have carefully submitted this product to analysis, and in every respect the results obtained were satisfactory. If boiling point and specific gravity are indicative of purity, then it is irreproachable in character, for the former was found to be 35°C. and the latter 0·721, figures coinciding exactly with chemically pure ether. Moreover, it gave absolutely no residue on evaporation, was entirely free from acid and contained no products of oxidation or decomposition. It would be well if all preparations used in medicine were equally pure.

GENUINE OLD COGNAC.
(MESSRS. GAUTIER FRÈRES AND HENRI TURPIN, THIRSK, YORKSHIRE.)

Chemical analysis cannot fully establish the actual origin of a spirit, but doubtless this is a genuine cognac. It is shipped from the well-known house of Messrs. Gautier Frères, Cognac, and each bottle bears the stamp of the "Union des Fabricants." We have submitted it to analysis, with the view of determining how far the results coincide with genuine brandy. As will be seen from the following result, they coincide in every detail. Thus the extract amounted to 1·17 per cent.; the mineral matter to 0·07 per cent.; the alcohol, by weight to 40·45 per cent., by volume to 47·83 per cent., equal to 83·83 per cent. proof spirit. The extractives on incineration evolved a smell which was very characteristic of genuine cognac. Rough as it may

appear, this is a test which in experienced hands affords fair evidence of the origin of the spirit. As regards alcoholic strength it is somewhat low, but the taste is peculiarly smooth and satisfactory. Much has been said about spurious brandy of late, but we have reason to believe that this is a genuine article.

VINCERDA COCA WINE.

(PHILIP CERDA, 10, LEICESTER-PLACE, LEICESTER-SQUARE, W.C.)

The valuable therapeutic principles of the leaf of erythroxylon coca are evidently contained in this agreeable wine, as on suitable treatment cocaine was successfully extracted and identified. Extended analysis gave the following results: Alcohol by weight 13·00 per cent., by volume 16·05 per cent., equal to proof spirit 28·13 per cent.; extractives, 4·99 per cent.; mineral matter, 0·21 per cent. In respect of spirit strength, therefore, it is similar to good port, possesses a similar flavour but is less sweet and not so full-bodied. The valuable coca leaf extractives, in fact, replace to an extent the less valuable sugar of ordinary wine and they communicate an unmistakable flavour to the wine, affording some evidence of the genuineness of the preparation. The value of coca wine as a restorative and stimulant is now recognised, and where indicated the above preparation may be suitably prescribed.

EUCALYPTUS GLOBULUS OIL (PLATYPUS BRAND).

(THE TASMANIAN EUCALYPTUS OIL COMPANY, 138, LEADENHALL-STREET, E.C.)

This preparation was marked, as all similar preparations containing a desirable proportion of eucalyptol are marked, by an especial fragrance of smell. Submitted to fractionation the following results were obtained: At 170° C. 6 per cent. distilled over, between 170° and 172° 28 per cent., between 172° and 175° 18 per cent., between 175° and 177° 19 per cent., between 177° and 178° 3 per cent., between 178° and 180° 11 per cent., and the remaining 15 per cent. came over at points above 180° C. There were traces of water in the oil. Inasmuch as the boiling point of eucalyptol, which is regarded as the valuable active principle of eucalyptus oil, is about 176° C., it will be seen that this brand (the Platypus) is desirably rich in this most important constituent. The specific gravity of the oil at 155° C. was found to be 0·9172. Further examination elicited the admirable purity of the product. Eucalyptus is an excellent, agreeable and effectual antiseptic, and in view of the foregoing results the suitability of this specimen for all purposes where antiseptic treatment is required cannot be disputed.

SODA WATER IN SYPHONS AND A DEVICE TO SECURE ITS GREATER ORGANIC PURITY.

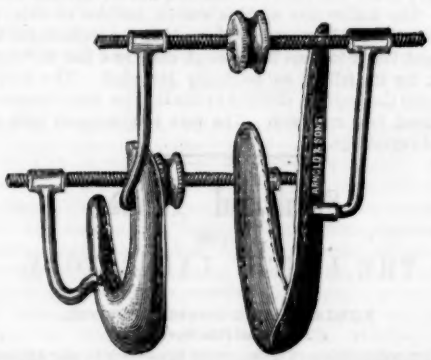
(THE BANGOR CITY MINERAL WATER COMPANY, BANGOR, WALES.)

We have on a previous occasion examined the soda water made by this company, but it is only just to recognise the efforts which they have quite recently made to still further improve the quality of the aerated waters distributed in syphons. Syphons, however carefully filled, will frequently show a considerable deposit of dirt or the water will exhibit a more or less opalescent appearance. This may be due to an accumulation of dust, meal or other objectionable matter in the nozzle of the syphon whilst it has been lying empty. By means of a syphon cleansing jet which this company have invented, a specimen of which we have examined, the interior of the syphon nozzle is thoroughly cleansed before it is attached to the filling machine. The jet, if it is to be used for cleaning the nozzle only, is attached to the ordinary water-supply, but if required also for the rinsing out of the syphon it is attached to the pressure cylinder containing carbonic acid gas. The action is entirely automatic, and twenty dozen syphons, it is stated, may be easily cleansed by means of this device in an hour. We regard this as an important advance in the manufacture of pure aerated water, as we have frequently had occasion to complain of the dirty state of soda water and its consequent organic impurity, doubtless due, not to the water as it flows from the filling apparatus, but to the accumulation of dirt in the nozzle of the syphon. It is scarcely necessary to add that the soda water obtained from syphons so treated was found on examination to be perfectly free from organic matter. Thus the residue, on evaporation, did not show any perceptible discolouration or clearing on ignition, a test which is not responded to satisfactorily by some of the soda water commonly met with. Each syphon (one pint and a half) submitted to us by this company was found to contain 10·5 grains of bicarbonate of soda.

New Invention.

APPARATUS FOR FRACTURES OF THE LOWER JAW.

THE general surgeon, when called upon to treat a case of fracture of the lower jaw, commonly finds that, should a splint be necessary, he has to set aside the ordinary surgical rules for the treatment of fractures elsewhere, because of the special conditions by which this class is attended. In fractures of other bones a splint or the material for the making of one is usually at hand and can readily be applied. The common method of treating fractures of the jaw with four-tailed bandage and gutta-percha may fairly be considered unsatisfactory. To provide an effective and permanent splint for the jaw the general surgeon has often to call upon a dental surgeon for a special apparatus, and thus much valuable time may be lost before the fracture can be set. I am convinced that it is to this delay that most of the troubles incidental to this kind of fracture owe their origin. The saliva, laden with decomposing discharges and débris of food &c., bathes the ends of the bones and the soft tissues surrounding them. This condition is made worse by the constant play of the ends, due to the uncontrolled action of the masticatory muscles and to gravity, leading to abscess, necrosis of the ends and diffuse inflammation of the surrounding soft tissues.



I wish to draw attention to a new form of apparatus which I have devised for fractures of the horizontal portion of the jaw. The following are the chief advantages which may be claimed for it: 1. It can be applied in a few minutes, owing to its being universally adaptable. 2. It can be applied over and over again in different cases without alteration or renewal. 3. Its parts, being of plated metal, are easily kept clean. Bandages need not be used with it. It allows of free application of cleansing washes within the mouth. 4. Its application involves no other parts but the lower jaw. It interferes but little with eating and drinking or speaking and sleeping, because of the swivel action of its clamps. The splint consists of a plated metal horseshoe-shaped piece, which rests upon the table, and a similar one which is applied below the chin. These are fastened together by two movable clamps. To apply the splint, the mouth plate or metal gutter which is to take the teeth, or jaw if there be no teeth, is lined with ordinary splint gutta-percha. This is then warmed and driven down on the teeth and gums as far as the shallow plate allows. The chin plate, lined with the two layers of wash-leather, is put into position and held there. The swivel clamps are then fitted into both plates and, by the thumbscrew to each, can be made to clamp the plates together until the requisite tension is attained. The splint is made by Messrs. Arnold of Smithfield.

March 22nd, 1893. ROBERT C. ACKLAND.

THE LANCET.

LONDON: SATURDAY, APRIL 8, 1893.

WE present our readers to-day with the results of an inquiry which in very special circumstances we have instituted into the water-supply and drainage systems of the city of Chicago. If we had undertaken the examination of such matters in connexion with any town in the United Kingdom the proceeding would have demanded no apology. If we had prosecuted our inquiries in any plague-stricken district abroad there would have been ample precedent; but the present is, it must be confessed, beyond the scope of any similar journalistic enterprise that we are able to quote, and must therefore be justified upon its merits if it is to be justified at all. The reasons that have moved us are very simple and can be stated in a few words. They will, we hope, be found to be cogent enough to prevent any misunderstanding of our motives and even any serious complaint as to the course that we have pursued.

It is perfectly well known both here and in America that the condition of the Chicago River and the state of the Chicago water-supply have been matter of much adverse criticism for some years past, and have given occasion not only for discussion to critics but also from time to time for anxiety to the city authorities. A member of our staff, travelling last autumn in the United States, visited Chicago, and heard both there and elsewhere much discussion and no little censure of the sanitation of the city. Struck with the gravity of the situation which would arise if the thousands of visitors to the World's Fair should find themselves restricted to an unwholesome water-supply, in a year which is only too likely to witness a recrudescence of the cholera outbreak of 1892, he prosecuted such inquiries as a brief opportunity enabled him to make upon the spot, and took advantage of a private introduction to secure the services of an agent resident in the city who could follow up his inquiries if it were desired to pursue the inquiry further after his own return to this country. He was thus, when he arrived at home, in a position to report to us not only the current rumour as to the dangers lurking in the Chicago River and Lake Michigan, but also to give from authoritative sources an outline sketch of the systems of drainage and water-supply which are in fuller detail laid before our readers to-day, and thus to show that the talk of the streets had at least that colour of probability which is afforded by indisputable theoretical shortcomings in the design of the city sewers and the city waterworks. There was thus presented to us as the Editors of THE LANCET a duty which we were bound to undertake. So long as the sanitation of Chicago was a matter of purely domestic concern to the Chicago people, it was beyond our province, but when it had plainly become a matter of possibly life and death significance to thousands of our fellow-countrymen, who are proposing to accept the invitation of the American people and visit Chicago during the present year, we felt that the time had arrived, not for searching out precedents, but for making a new departure and setting at rest the disquieting questions that had been so pressingly forced upon our notice. We accordingly commissioned the gentleman who had made the preliminary inquiries to complete the task which he had undertaken, and charged him to spare neither trouble nor expense to make the inquiry thorough and to obtain such information as would enable us and our chemical advisers to submit to our readers a complete and trustworthy account of the matters brought into question and such advice as the circumstances of the case might demand.

So much it has seemed necessary to say upon the threshold of the present discussion, not only in our own justification, but also by way of explaining and defining the limits which we have imposed upon ourselves in dealing with the questions raised. The matters treated of are matters of capital importance to the people of Chicago, and there is much which, if we were free to treat of them under that point of view, it would be fitting and even necessary to say, but which has in the existing circumstances been left unsaid. Our object has been the practical one of ascertaining as far as possible what risks, if any, are involved in the visit of our fellow-countrymen to Chicago and of contributing to the success of the Exhibition by such counsels as may enable visitors and their entertainers alike to be upon their guard against such dangers as may be avoided or minimised by vigilance and well directed observance of the laws of health. It will be found upon reference to the report of our Commissioners that there are some points, and especially the unscientific use of ice in cooling water, to which the attention of the public in Chicago needs to be most carefully and seriously directed. These will, we hope, receive the consideration to which they are entitled on the part of all concerned. But it is also pleasant and not at all surprising to find that defects have been magnified and faults exaggerated by ill-informed rumour, and that it may reasonably be hoped that the great enterprise of the International Exhibition will be carried through without any such untoward concomitant as an outbreak of epidemic disease. That it may be so is the sincere wish of all parties on both sides of the Atlantic. We are the better able to express the sentiment because we can indulge the hope that our well-intended criticisms may not be without some effect in helping to secure this great result.

THE experiment in "the life of a free people" initiated many years ago by Leicester is being put to the test. The particular freedom in question is the freedom to suffer from small-pox. The experiment is interesting to the public, but it is not so highly so as some of the sanitary leaders are apt to think, save to the people of Leicester themselves. Still it has a certain human interest, and deserves to be watched with attention by all intelligent students of human nature, and especially by students of human folly. Two contributions to the study of great value have appeared lately in our columns: one, a letter from Dr. PRIESTLEY,[1] the medical officer of health for Leicester itself; the other[2] a paper entitled "A Critical Examination of the so-called 'Leicester System' of Isolation and Quarantine," by Mr. A. T. BREMNER, L.R.C.P.Edin., member of the Leicester Fever Hospital Com-

[1] THE LANCET, March 18th, 1893.
[2] THE LANCET, March 25th, 1893.

mittee. Two gentlemen more entitled to speak with authority and information on the subject could scarcely be found, and we are glad to have been the medium of conveying the important information they have to give and the light they have to throw on the "marvellous success which for the past twenty years has attended the efforts of the sanitary authorities in stamping out small-pox without recourse to vaccination." These words were used by a member of the Leicester Town Council as lately as November last; and they are open to the criticism of being at least incomplete and hardly candid. The writer was in the position then to know, what we long since pointed out, that so far as the protection of Leicester was concerned it depended chiefly, as the protection of every town must do, on vaccination. As far back as June, 1886, we ascertained by careful investigation on the spot that whenever a case of small-pox occurred and was notified in Leicester, it was taken charge of by revaccinated persons and that all the persons exposed to its influence in the house in which it occurred were not only isolated but were revaccinated. This has been the system of the medical officers of health of Leicester before and since then, and yet up to November last the members of the Sanitary Committee and others have not hesitated to represent that they protected Leicester "without recourse to vaccination." For years past this delusion has had a certain plausibility and acceptance throughout the country. Vaccination has been ignored in the Leicester reports and sanitation has been all in all. Not in Leicester only, but in the country generally, small-pox has been in abeyance. In London and in the twenty-eight large towns the record has been—no death from small-pox and scarcely even a case of the disease. It was easy in such circumstances to protect Leicester or any other place with a cordon of vaccinated persons to deal with the stray cases that occurred and were immediately notified. Everyone that knew the nature of small-pox epidemics foresaw that, though this "system" might have a show of success whilst the disease was in abeyance, it would break down as soon as it began to reassert itself, and, as in "the life of a free people," they began to object to isolation as well as to "quarantine." "Quarantine," says Mr. BREMNER,[3] "being a voluntary act, part of the life of a free people, we met in October with the first refusal in the case of a person who absolutely declined to enter hospital quarantine, and as firmly declined to be revaccinated. This person fell ill with the disease in due course and was admitted to hospital." Mr. BREMNER adds: "It is incorrect to say that quarantine is carried out without recourse to vaccination and revaccination. True vaccination is not put into practice as it ought to be." It might have been hoped that when the sanitary authorities of a town had the courage to defy the experience and the united wisdom of the profession in the matter of vaccination they would at any rate be without fault in the matter of accommodation for isolation. Mr. BREMNER'S description of the building erected for small-pox cases, then used as a scarlet fever hospital, with the reserve of a block for small-pox patients ten yards from the western extremity of the main building, reads like a device for securing that the children affected with scarlet fever—*unvaccinated* children for the most part, be it remembered—shall have small-pox as well. This, at any rate, was the natural sequence of events. The following passage from Mr. BREMNER'S paper vividly records this fact as well as the advantage of vaccination.

"On Oct. 31st, 1892, the hospital was more than full, containing 158 patients suffering from scarlet fever. Of this number eighty-four were vaccinated, including those vaccinated by the medical officer of health. Of these eighty-four vaccinated children not one contracted small-pox. The remaining seventy-four were unvaccinated; thirteen of these contracted small-pox and four died. Small-pox having broken out amongst these children, it became necessary to send the remaining scarlet fever cases to their own homes, where they were kept under observation and some of them were readmitted to the hospital suffering from small-pox."

All this has occurred under the management of a sanitary authority who have been lecturing the country on isolation and sanitation with an air of superior knowledge and have been feeding an agitation which is threatening to relax the severity of the Vaccination Acts. It is idle to think that any system of notification or isolation can of itself protect unvaccinated persons from small-pox. Both isolation and notification are interferences with "the life of a free people." Both will be evaded, especially under Leicester standards of the respect due to the laws of the land. Leicester itself is affording illustrations and is paying the penalty of lawlessness. Its sanitary authorities have set the example of disrespect to public law whilst thinking that laws of their own would be successful. We learn that already 140 cases of small-pox in Leicester have occurred and 10 deaths (2 adults and 8 children unvaccinated). Of the 140 cases 83 were adults, 77 being vaccinated and 6 unvaccinated; 57 were children, 7 being vaccinated and 50 unvaccinated. These statistics should be read in connexion with the facts given in the letter of the medical officer of health of Leicester in THE LANCET of March 18th, showing the risk to the unrevaccinated members of the staff of the hospital. "Of these, 28 in number, 22 were protected either by a previous attack of small-pox or by revaccination (including 8 whom I revaccinated), whilst the remaining 6 had been vaccinated in childhood, and so were not 'sufficiently' protected. Of these 6 inefficiently protected officials, *all of whom refused revaccination which I offered them*, 4 have since contracted small-pox and 1 has died, so that 2 only of the staff now remain inefficiently protected and it will be interesting to note their future histories. The 4 recent additions to our hospital staff have now been revaccinated. One nurse, *said to have been revaccinated* ten years ago, has suffered from a doubtful and abortive attack of small-pox." Here we leave this subject. Few can doubt that a wave of epidemic small-pox is moving towards us that will endanger all unvaccinated children and all unrevaccinated adults [and adolescents. The boast of Leicester anti-vaccinationists has not increased their security and the efficiency of revaccination is demonstrated by their own medical officer of health. If it so happens that the relaxation of the Vaccination Acts should be deferred perhaps even Leicester opinion may undergo a change; but this is a sanguine view.

[3] THE LANCET, March 25th, 1893.

THE first impression which a cursory perusal of the voluminous and intricate Bill that has been introduced by the Government for the purpose of completing what may be called the municipalisation of rural districts, commenced by

the preliminary Act of 1888, gives even to a reader who is tolerably familiar with the matters with which it deals is that it is extremely difficult for anyone who does not possess such an acquaintance with what lawyers call the "purview" of the Bill to form any adequate idea of what its practical effect is likely to be. The leading feature of the Bill clearly is intended to be the parish council, and it is to this element that the hopes and criticisms alike of those who may be interested in it will be mainly directed. The creation and functions of district councils, consisting as they do in a great part of a mere transference to the new bodies of the organisation and powers of rural sanitary authorities and highway boards, will excite but little interest, as they involve only questions of administrative detail; but it is around the parish councils that the fray in committee on the Bill may be expected to gather. They are its *raison d'être*, and by the general outcome of opinion as to its provisions for their creation and powers it must stand or fall.

Upon the Bill as a general administrative measure for the completion of the scheme of local government initiated by the Act of 1888 this is not the place to offer any criticisms. Abundant artillery of this calibre will be directed against it as it passes the ordeal of committee by the numerous members of both Houses of Parliament, who are well able by their experience in the direction of local affairs to detect its weak points and to remedy its defects. Our object is to consider it from a purely sanitary point of view and in the light which a somewhat prolonged acquaintance with sanitary administration in rural districts may afford for estimating the effects which, if passed, it is likely to have upon sanitary progress in these localities.

The first remark which, in looking at the Bill from this point of view, it occurs to us to make is that, as a direct contribution to sanitary legislation, the Bill might just as well have not been brought in at all. From the title of the Bill to the end of the last schedule there is not one single word that adds in any degree to the powers of dealing with preventable disease, of abolishing its causes, or of remedying those innumerable defects in existing sanitary legislation by which the action of local authorities and their officials is hampered in contending with these evils. Unlike the Act of 1888, which, amidst a wilderness of non-sanitary provisions, contained a clause enabling county councils to appoint county medical officers of health—a power of which, by the way, they have in but few cases as yet availed themselves—this Bill is throughout merely a scheme for organising, and in some degree for reorganising, local administration. If, therefore, the Government have any idea of claiming credit for it as a sanitary measure, it is just as well that, before commencing its discussion, they should be candidly invited, in the well-known words of SYDNEY SMITH, to "clear their minds of cant."

Having said this much, we are the more willing to bear testimony to the important effect which the Bill may possibly have, if it become law, in indirectly promoting an interest in intelligent sanitary administration and in this way contributing to raise the standard of health in rural districts. Although we by no means share the optimistic views which are entertained by some of those who have been helping of late to voice public opinion in favour of the need for parish councils, and as to the great things which are to be expected from them, we readily admit that the organisation of the parish, as the unit of sanitary as well as of all other local administration, is the indispensable foundation of any rational system of local self-government. It is only by giving local opinion in a parish the opportunity of what may be colloquially called "licking itself into shape" by means of a recognised organisation, invested with distinct powers and acting on a well-defined programme, that the motor energy can be acquired which is essential in order to effect many sanitary improvements. It was urged as a justification of the Education Act that having enfranchised the working man it was next necessary to educate him, an argument, it must be admitted, which savours somewhat of the "cart before the horse" form of logic. So of the agricultural labourer: as he is now politically the master of the situation, it is only right that he should have every opportunity of acquainting himself, not only with the objects and advantages of sanitary administration, but with the difficulties which attend it.

To take for instance an illustration from the most familiar of all forms of sanitary improvements—namely, drainage. Sub-section E of Clause 8 of the Bill empowers a parish council "to deal with any pond, pool, open ditch, drain or place containing or used for the collection of any drainage, filth, standing water or matter likely to be prejudicial to health." Now, parenthetically, it may be remarked that the word "deal" which is here used is not deficient in that sort of ambiguity by which the framers of Acts of Parliament so often seek to avoid committing themselves to intelligible precision. How a body which is limited to an expenditure not exceeding one penny in the pound for the financial year is to "deal" in any sense except a perfunctory one with nuisances of this description, which frequently can only be dealt with, in the sense of abating them, by considerable outlay, it is not easy to see. But let that pass, and let us assume that the way in which the parish council would deal with such a matter would be by presenting a scheme for its abatement to the district council. Now here is exactly the point where the educational influence of the parish council will soon be felt. The primary idea of most people, whether parish councillors or not, in regard to nuisances of this description, is to pass them on to their neighbours as rapidly as may be by laying a drain to carry them off, with sublime indifference as to who is to pay for the drain and as to what is to become of the "nuisance" when, as it is called in rustic vernacular, it gets to the other end of the drain. The parish councillor will now have to make himself more fully acquainted than he has hitherto in his unincorporate capacity had an opportunity of doing, with the difficulties involved in dealing with drainage effluents and with the virtues of a system of dry conservancy carried on upon his own premises.

That the opportunity of thus educating himself in these and other practical measures connected with his own physical and social improvement cannot fail in time to be attended with beneficial results to parish councillors and their constituents alike, a man must be very blind or very bigoted to deny. But that the parish council is going to effect any very sudden amelioration of rural life it may be permitted to those of us who know something practically

about rural parishes to doubt. For what, after all, will the Parochial Council of the Bill of 1893 effect which could not be compassed by the Parochial Committee of the Public Health Act of 1872? That Act gave a rural sanitary authority power to delegate the whole of its powers, if it felt disposed to do so, for any parish in its district, to a committee of ratepayers living in the parish selected by itself. No power could be wider, no guarantee for getting an effective body together could be more complete, inasmuch as it was possible for the authority to put any person upon the committee who was likely to take an interest in its work. And what have been the results of the exercise of that power? So far as we can judge they have been very small. Here and there a parish committee has done good work and has fully justified the advice which called it into existence; but in the majority of cases it has more or less rapidly become effete, the victim either of intestine dissensions or of a sort of creeping paralysis of all its energies. It may, perhaps, be contended by the advocates of the present Bill that parochial committees have failed where parish councils will succeed, because they have, as a rule, ostentatiously abstained from seeking the coöperation of the very class whom the latter bodies are expected to attract. But here we are trenching upon the ground of very hypothetical considerations with which we need not now further deal.

There are numerous problems of this character, as well as of a more practical kind, connected with matters of organisation and administration, with which the Bill bristles, and which will doubtless be thoroughly threshed out when it gets into Committee. It is inevitable that the draughtsmanship of such a measure should, notwithstanding the great experience which must be brought to bear on it by the officials of the Local Government Board, be attended with obscurities, even to those who are pretty familiar with the subjects with which it deals. But, in spite of all the criticisms to which it may be subjected—and they will certainly be both numerous and weighty—it must be admitted to be a valuable contribution to the edifice of a national system of local sanitary and general administration, the foundation-stone of which was so ably laid by Mr. STANSFELD in the Public Health Act of 1872.

In conclusion, it may perhaps be well to say, for the information of those of our readers who are personally interested as medical officers of health in sanitary work, that there is nothing in the Bill which directly affects vested interests, except perhaps in regard to those portions of sanitary districts which are situated in two or more counties. There can be no question that the creation of parish councils will tend materially to increase the duties of county councils, and it is difficult to see how these bodies are to grapple with much of the work which will be thus thrust upon them without the assistance of a skilled medical officer of health. Those bodies who have not yet availed themselves of the power given them for the purpose by the Local Government Act of 1888 will therefore have an additional incentive to do so, of which it is to be hoped that, in view of the good results which have attended the county appointments already made, they will not be slow to take advantage.

Annotations.

"Ne quid nimis."

MEDICAL AID ASSOCIATIONS AND THE GENERAL MEDICAL COUNCIL.

AT a National Conference of Friendly Societies held at the Foresters' Hall, London, on March 29th, it was resolved to memorialise the General Medical Council of the United Kingdom with regard to the action taken by certain members of the medical profession respecting these societies and the demand that had been made that the governing body of the profession should stigmatise as "professionally infamous" those registered practitioners who had accepted engagements with these associations. Mr. Ballan Stead, who moved the resolution, asserted that the success of these institutions had brought upon them a most unjust charge from certain dissatisfied members of the medical profession. The General Medical Council may be trusted to consider with care the representations of the Friendly Societies on this important subject. At a Banbury Friendly Societies Medical Association banquet, presided over by the Mayor, this subject was alluded to in the toast of "The Medical Staff of our Association" by the proposer and by Mr. Raye, the medical officer, who responded. Mr. Raye called on the General Medical Council to deal with the question of unqualified assistants placed in branch practices at a distance from their principals and left with a book of blank death certificates signed by the principal. Mr. Raye should have remembered that the General Medical Council has already dealt with this scandal and has removed the names of several practitioners from the Register for complicity in it. Mr. Raye denied that there was increased mortality amongst the patients of the Medical Aid Associations. He made some dignified observations on medical etiquette and expressed his conviction that the General Medical Council would see justice done to such institutions.

THE TREACHEROUS SPRINGTIME.

WE have been favoured lately with exceptionally bright and fine weather for the time of year. The month of March, 1893, divested itself entirely of its blustering, leonine attributes and passed through its allotted period with a lamb-like placidity usually associated in our minds only with its closing days.

> "Proud-pied April, dressed in all his trim,
> Hath put a spirit of youth in everything,"

and the "showery month" so far has not been true to that portion of its traditional reputation. The Easter holidays which have just passed will probably, with general consent, be considered to have been blessed with the most enjoyable weather experienced at this season for many years. Under these circumstances we fear that we may be thought to be pessimistic and unduly jealous of exercising the proverbial right of the Englishman to grumble when we venture to describe the present state of affairs meteorological by the heading of this annotation. In sober truth, however, a few words of warning may be most usefully addressed by our readers to their patients. We are so accustomed to read in poetic language of "gentle spring" and "ethereal mildness" that we are apt to connect the two, and to forget that such a springtime as we are now enjoying is full of pitfalls to the unwary and by no means free from danger to the most careful. The question of clothing, for instance, is a most difficult one. "Cast not a clout till May be out" is an undeniably wise saw as a general rule, but in weather such as the present it is attended by its disadvantages. A day on the river, a game of cricket, a ride on horseback or

on a bicycle, and even the morning walk to business and other forms of usually healthful exercise are apt, under the influence of a powerful spring sun and winter clothing, to result in free perspiration—an unmixed blessing if a change of clothes and a "rub down" are immediately available, but otherwise only too likely to result in danger to health. The sun's rays, warm as they themselves seem, have not yet had time to warm the earth and so help to temper the chilling effects of a wind which has pretty surely at this period got "a touch of the east" or the north in it, and which, even if "south-west," is of a harsher nature than the gentle zephyrs to be expected later in the season. The invariable result is a prevalence of "bad colds." We do not wish it to be thought that we advocate the reckless casting off of winter clothing. In that respect the perils of Charybdis would doubtless be greater far than the dangers of Scylla. What we would rather urge is the importance of recognising that a few bright days do not make summer; that we are still exposed to the treacheries of spring, in the lap of which winter lingers, and, as was recognised by the poet Goldsmith, himself a medical man, even

"Chills the lap of May."

It is wise therefore during the spring not to indulge in forms of exercise which involve anything in the shape of violent muscular effort unless adequate precautions are taken to avoid the results of chill.

PENSIONS FOR THE AGED.

THE spirit of our age, whatever its defects, has not been wanting in purposes of benevolence. Examples of this tendency might be multiplied, but one will suffice for our present consideration. We refer to the series of schemes, as various as they are simple in their methods and colossal in their scope and enterprise, by which it has been sought to make provision for the aged poor. The subject has once more and quite recently beeen discussed in a paper by Dr. Frederick Alderson. From this we learn that the writer's preference is for a system of universal endowment by which the national purse would be taxed for the maintenance of all persons over sixty-five to the extent of 5*s.* weekly. He contends that so small a gratuity would not obviate prudent thrift but rather stimulate the recipient to its exercise. Filial piety would in like manner be rather encouraged than enfeebled. Non-payment of debts would disqualify the intending pensioner and thus honesty would be promoted in a matter with regard to which every medical practitioner has noted its frequent failure. Reference is likewise made in this paper to several other systems, partly provident, partly charitable, and resembling in their general outlines that above described. As regards approval of the essential principle upon which these are based—that of pity for the honest poor when incapacitated for work by age or illness—we should probably nowhere meet with any serious objection. It is when we come to ways and means that difficulties arise. Lord Halsbury said recently that the aged poor ought to be looked after by somebody; but this only raises a further question, Who is this somebody? Without professing to exhaust in discussion the stored logic of political economists, we seem to recognise, as the first and fittest incarnation of that somebody, the beneficiary himself. Whatever system be adopted, it is clear that the principle of self-help must play a prominent part in the creation of age pensions. In every other grade of life this rule holds good, and why not in that of the honest and prudent, though relatively poor, workman? We can see no reason why a trifling deduction should not be allowed on his weekly earnings and invested by way of premium for the expected pension, as in the case of Government salaries. One advantage connected with such a system would be its encouragement of steady working habits. Where the amount thus contributed did not suffice for the purpose intended, a first additional charge would naturally come upon relations, and parochial consideration would thus be limited to cases in which misfortune or other exceptional cause necessitated special and discriminating treatment. We should like to see this question of pensions considered from a purely actuarial standpoint. So far it would seem as if the tendency is too purely charitable to be compatible with any rational estimate of the value of money. While sympathising, therefore, with the motive which inspires the various schemes above referred to, we consider as essential to its useful application the full recognition of two fundamental duties—namely, self-help and filial obligation.

STRONG OBSERVATIONS BY A JUDGE IN SUPPORT OF A MEDICAL PLAINTIFF.

IT is always gratifying to record the success of an action to recover honest and well-earned medical or surgical charges and the observations of an enlightened judge. This is our pleasure to-day in noticing the case of Mr. Innes Griffin, medical officer of health for Banbury, who sued Mr. James Humphries for the sum of £7 7*s.* for services to his son involving fourteen visits, trephining for a cerebral abscess in connexion with ear disease and two whole night attendances. At the last moment a defence was started of improper treatment amounting to slow diagnosis and to gross negligence except with regard to the operation, which it was admitted was well and judiciously done. The judge offered to postpone the case for further professional evidence to rebut the ungenerous theory of the defence. But the plaintiff's counsel said the case was quite a clear one and elected to go on. The judge entirely approved the action of Mr. Griffin and "assured him that he left that court with the same high and honourable professional reputation which he had when he entered it." Asked about costs he said, "Certainly; costs on the higher scale and execution to-morrow."

THE OUTRAGE ON KING HUMBERT.

UNDER date Rome, April 1st, an Italian correspondent writes: "Twice within his beneficent reign of fifteen years has the King of Italy been made the subject of violence or outrage on the public highway. On Nov. 17th, 1878, when driving in state through the Neapolitan streets, his life was attempted by a fanatic named Giovanni Passanante. In the same carriage with the King were his consort, Queen Margherita, the Prince of Naples (a mere boy) and the then Premier, Signor Benedetto Cairoli; and, whether by mistake or by accident, the lethal weapon missed His Majesty and inflicted a severe wound on his minister, whose femoral artery it grazed, but providentially did not puncture or incise. Passanante, after his arrest, was made the subject of an elaborate medico-psychological examination by the well-known experts, Professors Tamburini, Buonomo, Tommasi and Verga, and their most interesting report given *in extenso* in THE LANCET (March 1st, 1879, pp. 321–2), which excluding all symptoms of mental neurosis in the would-be assassin found him a moral weakling, prone to fanaticism, and the convenient tool of sinister agents in the background. He is now, I believe, an inmate of the State Prison in the island of Elba, where, in solitary confinement, he has lapsed into complete dementia. Much less serious, though to the psychologist, perhaps, more interesting, was the outrage aimed at His Majesty on Saturday the 25th ult. in the Villa Borghese. The king was driving that afternoon with his field adjutant when, near the first fountain, there was thrown at him a paper packet charged with refuse. The assailant was at once arrested, and on examination at the Questura turned out to be one Luigi Berardi, who represented himself as a believer in none but Jesus Christ and His vicar the Pope and a sworn enemy of the Italian Kingdom. Dr. Pietro Malpieri

went minutely into his case and elicited facts that left no doubt that he was a madman of the type known to Italian classification as *megalomania religiosa*, which includes the hallucination of 'persecution.' There was a family history of neurosis, physical and mental. His father died an epileptic. His sister has been an inmate of a lunatic asylum for six years. At the age of nineteen, in an explosion of fury at an employer, he bit the latter so severely as to cause his death in hospital a few days after. For this he was condemned to seven years' solitary confinement at Orvieto. On his release in 1889, he was again imprisoned for 'cutting and wounding,' and after serving a short term of incarceration, he emigrated to New York, where he seems to have been an inmate of the lunatic wards of the public prison. Returning to Italy at the end of last year he led a 'persecuted' life in Rome, which culminated in the outrage on the king on the 25th ult. Since his arrest his religious exaltation has assumed the form of self-imposed abstinence from food, whilst he declares himself superior to the 'Vicar of Christ.' In all this we have a striking example of the looseness with which the criminal law is administered in the Italian peninsula, and of the levity with which dangerous lunatics, liable to epileptoid explosions, are allowed to be at large. Had Berardi been more vigilantly looked after during his first imprisonment he would never have been allowed to mingle freely in sane society, and the violence of which from time to time he was the perpetrator would have expended itself harmlessly within his place of confinement. In other countries the risk of letting epileptics engage in service, public or domestic, has of late been but too painfully realised, but in Italy its exemplification is so frequent as to call for State intervention. She holds an evil pre-eminence in 'impulsive homicide,' the authors of which, young and old, but especially young, fill her *bagni* to overflowing. Again, what in England would be called 'suicide while in a state of insanity,' is amongst Italians looked upon as quite a reasonable act if weariness of life or 'dissesti finanziari' (money difficulties) or disappointment in love or 'gelosia' (jealousy) are strong enough in the victim. But English jurisprudence is sounder than Italian in these cases, and, as a Milanese contemporary shows us, the 'epidemic of suicide,' as it calls it, which has saddened the columns of Italian journals for years past, ought to be probed to its root and traced to a mental neurosis as marked as it is wide-spread. The subject, I am happy to note, will come before the International Medical Congress in authoritative guise next September, by which time we are but too likely to have many more cases like Berardi's of 'dangerous epileptics at large,' or of that impulsive self-murder which a more rigid surveillance of neurotic youth might have prevented betimes."

"EVIDENCE OF THE CAUSE OF DEATH."

SUCH is the title of a pamphlet by Mr. E. L. Hussey, coroner for the city of Oxford, consisting of twenty-two pages. It is addressed to a "Brother Coroner," as would seem from the context, partly as an expression of opinion of Mr. Hussey's general views of coroners' law, and partly as a homily of advice to the addressee. The work does not readily lend itself to regular criticism, seeing that it is rather a collection of paragraphs of mixed nature than a logical examination of propositions. Reading between the lines, however, we are able to gather that the writer does not stand on common ground with the majority of medical practitioners. The argument seems to be directed against the calling of medical witnesses and the ordering of post-mortem examinations in all cases where the exact cause of death is equivocal. In more than one illustrative case the writer, as it appears to us, assumes an attitude of antagonism to himself. This is notably so where, on page 21, he cites the facts as deposed to at an inquest on a man who locked himself up in a room, was heard to groan, and on the door being broken open was discovered dead. A friend of the deceased and a medical man who accompanied him found in the bedroom a glass containing fluid "which *seemed* to them beyond doubt to be a solution of strychnia." The practitioner who attended the deceased was not called. It does not appear that an analysis of the contents of the glass was made. There was no post-mortem examination of the body. We ask, then, was the theory of suicidal strychnia poisoning, or strychnia poisoning at all, as embodied in the verdict of the jury, warranted by the testimony? And yet this case is given as a type of legal, medical and common-sense procedure. Whilst giving the writer all credit for the best intentions and admitting that neither on logical nor scientific grounds is it necessary to hold an inquest in every case of death under an anæsthetic, we still maintain that such a course is not only desirable but necessary to exculpate the anæsthetist and the surgeon and to satisfy the patient's friends. It is scarcely necessary to examine in detail the writer's views of chemical nomenclature; suffice it to say that they are not quite in accord with those adopted in standard works. A long list of popular expressions relative to causes, consequences and symptoms of disease is given. Mr. Hussey considers these terms "sufficient" and intelligible for the cause of death. Here we join issue, for in our opinion they are not all of them intelligible and consequently not "sufficient." On previous occasions we have insisted that whenever the cause of death is doubtful a post-mortem examination should be made, and, if necessary, a chemical analysis, and our opinion is not shaken after perusal of Mr. Hussey's pamphlet. Of course, there are cases of death from violence where the demand for medical evidence would be simply vexatious.

THE MEDICAL ELEMENT IN COMPETITIVE EXAMINATIONS.

SINCE the time of its institution the competitive examination has entailed upon all concerned with it almost as much anxiety as benefit. As a gauge of amassed information it is probably unrivalled; as a test of latent energy in the form of knowledge its value is at least open to question. After all, however, it must be allowed that no alternative system has yet been suggested as adapted to fulfil with equal efficiency the purpose of selection which called it into being. We must, therefore, it would seem, still bear with its drawbacks for the sake of its advantages. The great vice associated with the system is of course the necessity of cram which it involves. Out of this arise most, if not all, of its other defects. For the present we need not deal with the question in its literary aspect. There are other and physical considerations which are sometimes of even greater importance to the individual student competitor. It is in obedience to no mere professional fancy that medical inspection forms an important part of such examinations, since it is clear that health and character have at least as much to do with the actual utility of passed candidates as education itself. Health, indeed, is of these the more critical matter in this: that it cannot be regulated by mere will or by considerations of expediency. It can only be guaranteed by personal examination and the circumstances under which this is conducted are of the first importance. It is a wise rule which provides that a candidate shall, before entering himself for the contest in mental culture, present a certificate of sound bodily health. He is thus afforded some sort of guarantee that his studious labour, if allowed at this stage, will not end in disappointment on the score of physical conditions. Alas for human hope, illness and accidents do not respect the set stages of competitions and therefore a still later barrier of medical inspection is indispensable. Here-

occasionally the successful worker must halt and return disqualified. We do not doubt that some such late rejections have been fully justified by the presence of actual disease, however caused. At the same time it must be admitted that cases have occurred in which conditions of imperfect health, by no means important in themselves, have become so developed or aggravated by mere overstudy as to convey the impression of serious disability, an impression which a few weeks or months of leisure suffice to dissipate. Here surely there is room for amendment of existing custom, and the appropriate remedy is not far to seek. No possible objection could be raised against such an alteration of established rule as would defer the date of this second medical inspection to a period considerably later than that of the ordinary examination of candidates. We should strongly recommend the adoption of this practice wherever it is not already in use. Any more speedy method, whatever its apparent advantages, can hardly do justice either to the skill of the examiner or to the legitimate prospects of overstrained but still physically sound competitors.

DENTAL ADVERTISING.

THE question how to deal with advertising has been a very difficult problem to solve in all professions and just now is largely agitating the dental world. The general opinion held by respectable dental practitioners and by the community at large is of course that it is most derogatory to the profession as a body and that those who practise advertising are "quacks." Mr. Blandy proposes that a petition signed by registered dentists shall be presented to the General Medical Council, praying them to make it a matter of "infamous and disgraceful conduct," which means erasure from the Register, "if he conduct his practice by means of the exhibition of dental appliances or apparatus in an open shop, or in a window, or in a showcase exposed to public inspection, or if he seek to attract attention by means of public advertisements, or circulars describing modes of practice, or patented or secret processes, or by the publication of a scale of professional charges." With regard to the expediency of this movement it seems to us very doubtful whether the General Medical Council has any power to move in the matter, and further, even if it were so, whether the time is ripe to push it. It must not be forgotten that a large number of the registered dentists are still unqualified men and so are not under the control of any licensing faculty; but we think that it ought to be very strongly urged that all corporations granting a licence should insist upon a guarantee by the recipient of a declaration not to advertise. But the whole matter would be much more satisfactory if dental surgeons would take the trouble to become not merely affiliated with, but actual members of, the medical profession.

"HUMAN REMAINS IN THE CITY."

UNDER this heading the *City Press* of March 25th publishes the judgment of Dr. Tristram, Q.C., Chancellor of the Diocese of London, given at the Consistory Court of St. Paul's Cathedral on March 24th, upon the application of the rector and churchwardens of St. Michael Bassishaw. This was to enable them to remove human remains from underneath the church. The faculty was granted and the remains will be removed to the Great Northern Cemetery, care being taken to have the fact of the removal notified on a stone in the centre of the ground to be occupied by the remains and also in the vestry of the church. The Chancellor was careful to explain at some length that the order of the Home Secretary was not sufficient to ensure the removal of bodies from any church or consecrated burial ground without a faculty. No one appreciates better than we do the excellent adage "ne sutor ultra crepidam," and we have no wish to interfere with the duties of chancellors or any other ecclesiastical dignitaries; but in all that relates to the public health we have a right to speak with authority, and as Dr. Tristram himself referred to the case of St. Botolph's Church, Aldgate, we may remind him that we felt bound at the time to enter our protest against the faculty which he granted to reinter human remains in the vaults under that church, a position which was supported by the sanitary authorities of the city and by the Home Secretary. Moreover, these remains were removed to a suburban cemetery, notwithstanding an attempt on the part of the church authorities to over-ride the orders of the Home Secretary. The fact is that these faculties must be regarded as pure formalities. When the sanitary authorities have decided that for reasons of health human remains must be removed the faculty must perforce be issued as a matter of course and as a matter of form. Should a faculty be asked for to inter any bodies beneath a church it should be refused, since no ecclesiastical authority can be justified in doing that which is dangerous to the public health. What has recently occurred at St. Mary's Woolnoth, St. Michael's Bassishaw and other churches should convince everyone of the danger of burying any human body beneath a consecrated building used for worship. Sooner or later mischief will result, and the only effectual remedy is to remove the body to some suburban cemetery.

PREVENTIVE MEDICINE AT OXFORD.

OUR oldest University has at last awakened to the necessity of taking part in the progress of preventive medicine, and of rendering her degree in Public Health less exclusively restricted. Following the wake of Cambridge, this is now proposed to be open to all registered medical practitioners. A statute embodying this important change will be promulgated before Congregation on May 2nd next. There is to be an annual examination by four examiners, presided over by the Regius Professor of Medicine. The subjects will comprise (*a*) General Hygiene; (*b*) General Pathology, with special relation to infectious diseases; (*c*) Laws relating to Public Health; (*d*) Sanitary Engineering; (*e*) Vital Statistics. Every candidate must have been registered for a twelvemonth, must have spent six months working in a Public Health Laboratory, and another six months as assistant to a health officer of a town or county of at least 50,000 inhabitants. We trust that the statute will meet with no opposition, and that the Oxford Diploma in Public Health may be eagerly sought after, and confer the same distinction as the other degrees of this University.

WELLINGTON COLLEGE.

THE appointment of Mr. Pollock, assistant classical master at Marlborough, to the headmastership at Wellington College, in succession to Mr. Wickham, who will vacate the position at the end of the forthcoming term, is an occasion of which the governors of Wellington College have availed themselves to announce to the public and the parents of boys, present and prospective, the sanitary improvements which they have endeavoured to effect, regardless of cost, under the direction of Mr. Rogers Field, the well-known sanitary engineer. Nine years ago we opened the question of the insanitary condition of Wellington College. In the correspondence that then took place it appeared that the governors' attention had been called to the subject some years previously by the medical officer of the College, but without avail. Differences of opinion existed between the governors and Mr. Wickham, the headmaster, on the one hand, and Mr. Barford, the medical officer, on the other, not only as regarded the insanitary surroundings of the College, but also as to the local origin of the diseases which prevailed amongst, and proved fatal to, some of the boys. We opened our columns freely in the interest of the

College, as we thought, not only at the time but on subsequent occasions, till at last public opinion was sufficiently directed to the matter and the governors could no longer postpone giving their attention to it. The College has suffered, not only by the death of some of the boys and one of the most valued masters, but by the serious and widely spread illness of others, necessitating the removal of the whole school for a time. Nor are these the only evils that have arisen. Those of our readers who are interested in Wellington College can easily see for themselves the ill effect this long impairment of health has had on the scholarship of the boys by referring to the "Public School Record" in the *Pall Mall Budget* of Dec. 8th, 1892. Mr. Rogers Field in his report[1] congratulates the governors on the sanitary improvements he has been permitted to effect regardless of cost, which he considers make "Wellington College one of the best, if not actually the best, in regard to the completeness and excellence of its sanitary arrangements" as compared with similar institutions. We hope Mr. Rogers Field will not be doomed to disappointment. It would have been better for the reputation of the College had a comparison been made between the sickness of the past and preceding terms with those of previous years in order to show if there had been any decided lessening of sickness amongst the boys since Mr. Rogers Field's improvements have been in operation. Confidence in the institution has been shaken, as is proved by the falling-off in the number of the pupils. If the governors wish this to be re-established they must give proof that the works have had the desired effect in making the boys less liable to sickness and more vigorous in work, as health is as essential to work as work is to scholarship; for, according to the "Public School Record," in entrance scholarships at the universities Wellington College is below all other public schools and below most of the grammar schools which aim at university distinction. It is no small undertaking for the newly appointed headmaster to rectify this and we wish him every success.

THE QUEEN IN FLORENCE.

UNDER date April 3rd a Florentine correspondent writes: "Queen's weather in the City of Flowers—as near a definition of the earthly Paradise as can be given—continues to characterise Her Majesty's vernal *villeggiatura*. The cloudless skies, the brilliant sunshine, the crisp, restorative air just freshened, but not chilled, from the snow-wreaths above Vallombrosa and on the Pistoiese Apennines, make out-door exercise, whether for the pedestrian or the carriage inmate, a highly agreeable function, appreciated as it fully is by crowds of foreign residents who, for the time at least, have rendered Florence something like a suburb of London, of Paris or of Berlin, or rather of all three combined. Queen Victoria has visibly improved in health since her arrival on the 23rd ult. and greatly enjoys the 'still life' of the Villa Palmieri, with its opportunities for quiet little excursions into the rural neighbourhood and the exchange of kindly greetings on the hillsides with the simple country folk and their little 'hostages to fortune.' The loyal self-suppression with which the Florentines comport themselves under very strong temptation to the contrary leaves Her Majesty all the privacy she wishes, and doubtless enhances her sense of release from the 'cares that link with empire' and from the 'monotonous uncertainty' of a spring in the British Isles. Many of the public demonstrations at which the Queen was expected to assist have had to dispense with Her Majesty's intervention, the Princess Beatrice acting in her stead and acquitting herself with a gracious cordiality and effect which have won the hearts of the Florentines. One of these occasions was the distribution of prizes at the Circolo Filologico to those of the public—the cabmen and coach-hirers particularly—who had responded best to the regulations of the Society for the Prevention of Cruelty to Animals, and the interest shown by Her Royal Highness in the kindly treatment of the dumb servants of society cannot but react favourably on a movement to minimise the maltreatment and the sufferings of the brute creation and to humanise its often cruel and all too negligent masters. The great event of the week is the bazaar in aid of the reconstruction of the Church of the Holy Trinity, the increasing attendance at which has rendered its accommodation quite inadequate to the yearly augmenting demands of the British community. Here, again, the Princess Henry of Battenberg will represent Her Majesty the Queen and impart, it is anticipated, a spirit to the sale and a success to the enterprise which must accelerate the consummation it is intended to promote. Even more than on the occasion of Queen Victoria's former visit, Her Majesty's presence in Florence will give a manifest and enduring stimulus to the efforts of its leading inhabitants to improve the conditions, sanitary and social, under which they live, and will effectively reinforce the endeavour of the Duke of Aosta, who represents the King of Italy in the central city of the peninsula, to restore to it the prestige and the attractiveness which it has not quite maintained since it ceased to be the capital of an Archduchy. I may add that Florence has never been so full as during this week, and that with the ever-increasing influx of the foreign element on which its prosperity relies the municipality will be encouraged in the matter of water-supply, of drainage and of 'nettezza pubblica' (tidiness of the streets) so to improve on tradition as to silence the sanitary censure, all too justified by its past, and to replace some of the more formidable deterrents by real attractions to the passing visitor or to the permanent sojourner within its gates."

[1] The Times, March 24th, 1893.

THE "LEICESTER SYSTEM" OF TREATING SMALL-POX.

THE article contributed to the columns of THE LANCET by Mr. Bremner,[1] which, to our thinking, showed conclusively that, in respect to provision for isolation and inspection, Leicester has no claim to any special superiority over other towns, and in which, too, it is proved that the so-called "system," so far from being economical, as its advocates were wont to assert, is necessarily costly in proportion to its efficiency, has naturally aroused some indignant replies from those who have been for many years responsible for carrying it out. The matter was brought before the Town Council on the 27th ult. by Mr. Alderman Windley, the chairman of the Sanitary Committee, of which Mr. Bremner is a member. The chairman spoke warmly, but the fact that he should have felt it needful to speak at all says much for the state of disunion that exists amongst those responsible for the health of the town on this matter. Mr. Windley explained that the cause of the outbreak in the fever hospital was due to an error of judgment on the part of the medical officer; but he did not tell the Council that the ill-results of such an error would not have occurred at all had his committee had the foresight to provide sufficient accommodation for the isolation of doubtful cases. As regards the main question we cannot see that Mr. Bremner's version differs materially from that of Mr. Alderman Windley. The plain fact is, as we point out elsewhere, that Leicester, confident in its security by the adoption of "quarantine" as the chief means for combating small-pox, was unable to carry it out on the original lines from mere lack of accommodation. The essence of the "Leicester system" is the removal of members of infected households to "quarantine," and since that has not been carried out during the past three months it has failed. Nevertheless, the

[1] THE LANCET, March 25th, 1893.

energetic efforts of the medical officer, Dr. Priestley, seconded by his experienced chief sanitary inspector, have done much to minimise the risks of infection from households, although their members could not be actually confined in one place. We are glad to observe that Mr. Clifton, the chairman of the special committee—the premature publication of whose report was bitterly complained of by Mr. Windley—fully recognises that some modification must be made in the manner in which the principles of prevention of dissemination of small-pox are to be carried out. Leicester, having chosen to abandon vaccination, is bound to render its provisions for isolation as perfect as possible, and although it may suit the purpose of some of its authorities to attribute the present visitation to an unavoidable extension of the disease in a building wholly unsuited for the purpose, they have much to answer for in subjecting unprotected children to the chances of infection which the most careful precautions can in that case hardly obviate.

POISONING BY TINNED BEEF.

A FAMILY residing at Chelmsford partook of some American corned beef for breakfast on the morning of Wednesday, March 27th. The meat was observed to be slightly moist on the surface and did not drop out of the tin readily. It is also stated that the meat had a "spicy" flavour as of thyme. The mother, who is an elderly lady, about an hour and a half after breakfast complained of feeling giddy, and shortly afterwards persistent vomiting supervened, followed by cramps, spasm and diarrhœa. The father, son, daughter and a maid-servant were attacked shortly after, and for a time the life of the son was despaired of. All have now recovered. Unfortunately the remaining meat was destroyed. This, of course, is to be regretted, as in all such cases the unconsumed portion should be reserved for chemical and bacteriological examination. When examined a few days later the under surface of the tin was found to be corroded considerably more than was the case with other tins which had been kept a much longer time. In the scrapings of fat from the side of the tin both lead and tin were detected by Dr. Thresh. The symptoms, however, were undoubtedly those of ptomaine poisoning.

SOME LESSONS OF SUICIDE.

FEW of the misfortunes which can overtake a man are able so to overwhelm him that they do not leave open some avenue of hope, and the more especially if they are not attributable to conscious error on his part. The mind so conquered by depression that it cannot see this outlet is therefore surely unhealthy. It may doubtless be free from other ordinary signs of persistent and confirmed insanity, but it illustrates, nevertheless, a condition of weakness which in the grosser bodily fabric would pass for disease. Its disorder is not less a malady because it is often transient and is not related to known organic changes. In it we recognise the close connexion between rational and moral qualities, and it is the failure of both, but especially the latter, to influence their unfortunate possessor which is so grimly taught by suicide. Despair is the true exciting cause of such calamities, and this we take it is nothing else than moral short sight. We are all of us liable to suffer from it, and, though for the most part we know it only as a temporary disturbance of function, each of us can attest its prostrating influence and the strength of its resistance to the curative powers of reason and of faith. The case of a lad who lately poisoned himself with chloral hydrate because he failed to pass the entrance examination at the Durham Medical School was peculiar only in its secondary details. Naturally delicate, over-sensitive and over-anxious, he was stunned by his disappointment—and he died of this disease. Who has not known, like him, the infinite discomfort of a seemingly unbearable present and impossible future. Yet there is no truth more certain than that which tells us that everything comes to the patient hope which knows how to wait. It is in the possession of this divinely planted quality that we have the surest remedy for all those miseries of distrust which culminate and are by some believed to end with self-destruction. There is a subsidiary question of some interest connected with the case above mentioned. How came the unhappy boy to have about him a fatal dose of chloral? There was no evidence of the medicinal administration of this drug. We are, therefore, obliged to conclude that it was, as it easily might be, purchased of some neighbouring druggist, and the fact of its prompt and purposeful misuse affords a fresh reminder of the far from adequate restriction placed by Government upon the sale of poisonous remedies.

INFLUENCE OF THE SYMPATHETIC ON THE EYE.

HEESE has contributed to *Pflüger's Archiv* an important paper dealing with this interesting question, and an abstract of it appears in the last number of the *Neurologisches Centralblatt*. The question of the existence of a special dilator muscle for the pupil has long been a vexed one. The effect of the sympathetic in causing dilatation has been ascribed to contraction of the iris vessels by some, and to an inhibitory influence on the sphincter of the iris by others. Heese claims, by experiments on the cat, to have demonstrated the existence of a special dilator of the pupil. He has also investigated the mechanism of protrusion or retraction of the eyeball. These, he says, depend, firstly, on the condition of contraction of the bloodvessels of the orbit, and, secondly, on the contraction of the orbital muscle. Both are innervated from the cervical sympathetic. The influence of this is strongest on the orbital muscle, so that stimulation of the sympathetic causes protrusion of the eyeball. In the rabbit, however, the vaso-motor influence is predominant, and stimulation of the sympathetic in this animal by contracting the orbital bloodvessels causes retraction of the eyeball.

THE GRESHAM LECTURES ON PHYSIC.

WHEN Sir Thomas Gresham founded what he fondly hoped would constitute the basis of a real University of London he could hardly have imagined that his College would in course of time be given up to popular instruction in the art of medicine and surgery. The present Gresham Professor of Physic has held office for many years and has doubtless been often exercised to find suitable topics for his elementary instruction of the laity. That he may have sometimes erred in his selection is but natural, but at least he may be expected to exercise some judgment in the matter and avoid trenching on topics which can only be properly appreciated by those who have had a medical training. The syllabus of the next course of lectures which he is to deliver lies before us, and we observe with deep regret that Dr. Symes Thompson has, unwittingly we believe, transgressed against one of the cardinal principles of the College of Physicians, of which he is a Fellow. The course is to be devoted to the nose and mouth, subjects which doubtless admit of popular treatment and afford scope for the introduction of much useful and homely advice. Whether his audience will be able to appreciate all the topics included in the third lecture, in which he is to treat of the "Nose and Mouth in Health and Disease," may be open to question, and it speaks volumes for his proficiency in the art of lecturing that he should feel able to convey an intelligible view of the subject within the space of one hour. It is, however, in the scheme of the fourth and concluding lecture that we think Dr. Thompson has overstepped the limits which his

office imposes on him, and the best way to indicate this will be by quoting this part of the syllabus in full :—

"*Treatment of Disorders of Nose and Mouth.*—Prevention of Chronic Catarrh of Nose, Throat, Ear &c.; Polypi and Alteration in the Nasal Bone; Electrical and other Remedial Treatment of the Tongue and Throat; Use of Caustics and Medicaments to Palate and Lips; Treatment of Hare-lip and Cleft Palate."

It is a pity that Dr. Symes Thompson should fail to see that no useful purpose can be served by dealing with such topics as these in a public discourse and that he should mar the good work of instructing the laity in the principles of health, which he has so often undertaken, by the introduction of details of medical and surgical treatment the full bearing of which can only be appreciated by professional men.

ABUSE OF LONDON DISPENSARIES.

THE *City Press* reports the opinion of a medical man—the medical officer of a London dispensary—that London dispensaries are much used, that is, much abused, by those who can afford to pay. This gentleman was struck with the well-to-do appearance of a man with a free letter. On inquiry, he turned out to be a foreman and earned regularly upwards of 50*s.* a week. Such a patient would scarcely be a fit member of even a provident dispensary. He would be excluded by the rules of so good a provident dispensary as that of Northampton, which provides that no shopkeeper or foreman in a factory can become a member. It is a fraud for such a man to appear with a free letter at a charitable institution, the blame of which must be shared between him and the subscriber who gave him the letter. Our city contemporary does good service by publishing such facts.

PREVALENCE OF FEVER.

DURING the week ended March 25th scarlet fever showed somewhat greater prevalence in the large towns of the kingdom compared with that during the former week. More than 1000 cases were notified, London supplying about 400 of them; next came Sheffield, West Ham, Leicester and Liverpool. Some 300 cases of diphtheria were reported, London contributing more than half of them, West Ham and Cardiff coming next. Of the total number of cases of enteric fever reported the metropolis furnished little more than a fifth, Liverpool and Birmingham the next largest number. It is reassuring to know that, though scarlet fever incidence in London has not diminished, the mortality from this disease has declined, the deaths from scarlet fever having been last week below the average. Though more cases were admitted into hospital the numbers remaining under treatment are about the same. The diphtheria mortality, though considerably less during the week, was yet greatly above the average. More cases were admitted and more remained under treatment. It is gratifying to be able to record that the influenza mortality is distinctly less.

SOCIETY FOR THE STUDY OF INEBRIETY.

SIR WILLIAM CHARLEY, Q.C., D.C.L., late Common Serjeant, read an elaborate paper on the "Inebriates Acts, 1879 and 1888: Ought we to amend them?" at the annual meeting, held in the rooms of the Medical Society of London, on the 4th inst., the President, Dr. Norman Kerr, in the chair. The learned gentleman accepted the definition of inebriety as a disease closely allied to insanity and recognised the right and duty of the State to provide curative detention for inebriates of all classes. He showed that in the Bill drafted by him in 1877 the reception of inebriates by a retreat was a comparatively simple matter, the request for admission requiring attestation by only one justice or by a commissioner to administer oaths in the Supreme Court. The only mode of admission at present is by appearance before two justices, which deters many applicants. Sir William Charley had also provided for the reconveyance to the retreat from which he had escaped of any fugitive under the Acts, whereas the existing law necessitates the intervention of a justice's warrant and apprehension of the escaped patient by the police. Dr. Dalrymple's Bill of 1870 proposed to empower guardians to detain inebriate paupers for treatment. In the 1877 Bill Sir William Charley provided for compulsory seclusion by justices in Petty Session, but he now preferred the Victorian authority of a Master in Lunacy or a County Court Judge on the production of two medical certificates. Sir William Charley endorsed the dicta of Drs. Dalrymple and Norman Kerr on inebriety as a disease demanding therapeutic seclusion, either voluntary or involuntary, and pointed out the public approval of such treatment by Lord Aberdeen when Home Secretary, Earl Shaftesbury, Lord Selborne and Mr. Justice Grantham, in addition to many eminent medical authorities.

DEATH DURING THE ADMINISTRATION OF CHLOROFORM.

A BOY, aged nine and a half years, suffering from necrosis of the lower jaw, was about to be operated on at King's College Hospital on the 3rd inst., but before he was brought under the influence of the anæsthetic he suddenly died. Chloroform was being administered in the usual manner on a towel, but after a few inspirations had been taken and whilst still quite conscious, the boy vomited, began to struggle violently, sat up on the operating couch with a markedly frightened aspect, and on being placed back on the couch his spine became arched and his heart ceased to beat. The respirations continued for some minutes (at least five) after the cessation of the heart's action. Strychnia and ether were injected, ammonia was applied to the nose, hot and cold frictions, artificial respiration, tracheotomy and the galvanic battery were all in turn resorted to, but the heart gave no sign of renewed action. At the post-mortem examination it was thought that there was a pale condition of the muscle of the right side of the heart and a somewhat thin wall, but nothing else abnormal was found. At the inquest, held on Wednesday, the jury returned a verdict of "Death from syncope through fright whilst under the influence of chloroform."

THE ETIOLOGY OF INFLUENZA.

THERE is an interesting contribution on this subject in the March number of the *Zeitschrift für Hygiene* by Dr. R. Pfeiffer of the Institute for Infectious Diseases at Berlin. After describing the bacillus of influenza, the best methods of staining and the manner in which he overcame the difficulties, hitherto insurmountable, in cultivating this enemy of mankind, Dr. Pfeiffer details the results of numerous investigations and points out the following practical deductions to be made from them. The bacillus grows very rapidly in pure cultures on a suitable soil, but no growth takes place at a temperature under 26° C. (78·8° F.) or over 43° C. (109·4° F.). In water at ordinary temperatures (60° F.) the bacillus dies rapidly (in eight hours). In bouillon it retains its vitality for from fourteen to eighteen days. Hence sputum &c., if not allowed to dry, is probably infectious for at least fourteen days; and we may here find the explanation of cases, recorded by competent observers, in which the infection appears to have been communicated by means of letters, clothing &c. The bacillus is very rapidly affected by drying. Cultures exposed to dry air at a temperature of 37° C. did not survive for more than two hours, and even in moist air usually not more than eight hours and never more than twenty. Sputum, if dried, was quite sterile in thirty-four to forty hours. Dr. Pfeiffer draws the following conclusions from these facts:—(1) The influenza bacillus is not capable of multiplication outside the human

body, either in water or in earth. (2) The spread of influenza by dry sputum can occur but seldom. (3) Infection is, as a rule, effected by means of the still moist secretions of the air-passages. Dr. Pfeiffer considers the catarrhal form of influenza to be by far the most frequent. In mild cases, scarcely to be distinguished from ordinary catarrh, he found the bacillus in enormous numbers in the secretion of the nose, whereas in cases of simple catarrh the secretion is almost sterile and certainly contains no bacterium to be mistaken for the influenza bacillus. During the acute stage the bacillus is present in the expectoration in large numbers. It sometimes persists in it for weeks, or even months, thus explaining those cases of prolonged convalescence which have been noted especially amongst tuberculous individuals. The general symptoms are to be regarded as the result of the absorption of influenza toxine. The bacillus may reach the pleura and there excite a pleuritis. No animal is known to be spontaneously affected by influenza. Guinea-pigs are very susceptible to the influenza toxine, exhibiting symptoms of fever, dyspnœa and extreme muscular weakness, strikingly resembling the clinical appearances in man. In conclusion, Dr. Pfeiffer points out the importance of thorough ventilation in all places where many people are assembled, such as theatres, schools and barracks, since every cough or sneeze expels infectious material into the air. He further suggests the use of disinfecting washes for the nose and mouth and the inhalation of antiseptic vapours, and concludes by expressing the hope that the knowledge of the cause of this remarkable disease may lead to the discovery of a specific remedy.

TUMOUR OF CENTRUM OVALE.

IN the last number of *Brain* Dr. Landon Carter Gray of New York relates a case in which a tumour in this situation gave rise to paralysis of motion and muscular sense. The patient was a man aged thirty-eight, whose left leg and arm had gradually become weak about a fortnight before he first came under Dr. Gray's observation. Coincidently with the onset of weakness the patient had suffered from headaches and a certain amount of insomnia. The only significant points in his previous history were an attack of what was apparently Ménière's disease some years before, which had been succeeded by permanent deafness in one ear, and the occurrence of an angioma in the region of one knee. This had been removed by means of caustics. About a year before the symptoms of cerebral trouble began a hard nodule had appeared in Scarpa's triangle and had gradually spread so as to involve the whole of this anatomical area. The patient had never suffered from any convulsion or loss of consciousness. There was no distinct syphilitic history, but iodide of potassium had been administered. It was borne so badly, however, that it could not be persevered with. On examination there was found to be considerable loss of motor power in the right leg and also in the arm. In the foot sensibility to tactile and painful stimuli was slightly impaired, but the temperature sense was normal; the muscular sense, both in the fingers and foot, was very much impaired. There was no affection of the face or tongue, the ocular muscles were not affected, and there was no optic neuritis. A diagnosis of subcortical tumour was made. A fortnight later the paralysis had advanced, so that the right leg was completely paralysed, and in the corresponding upper limb only slight movement of the fingers was possible. Sensibility to touch and pain in the right hand was now distinctly affected, the face and tongue were still free, but the headache had become intense. Intelligence and speech were unaffected. On being trephined the dura mater bulged very much, but was otherwise normal in appearance. No tumour was found, although the brain was punctured in various directions. The patient became comatose very soon after the operation and died three days later. At the necropsy the calvaria was found to be unusually thick and there were inflammatory changes at the seat of operation. On making vertical sections of the brain from before backwards, and examining them carefully, a neoplasm about the size of a "hickory nut" was found in the ascending parietal convolution, in the neighbourhood of the posterior extremity of the convolution, and situated about a quarter of an inch beneath the cortex and about the junction of the upper and middle third. This was cystic in the centre and on microscopical examination was found to be a small round-celled sarcoma of the melanotic variety. The nature of the tumour in the leg is not stated, but the case illustrates the possibility of the existence of loss of muscular sense with the almost complete retention of sensibility to ordinary tactile, painful and thermal stimuli.

LIBEL ACTION BY A SURGEON.

AT the recent Birmingham Assizes, before Lord Justice Bowen, Mr. F. R. A. Evans recovered damages to the amount of £75 against the proprietors of the *Birmingham Daily Post* for an article written in December, 1889, in reference to the trial of the plaintiff for the manslaughter of a woman during her confinement, in which the plaintiff was acquitted, the judge describing the prosecution as vindictive. The judge said it was remarkable that the plaintiff did not complain till three years after. Such actions are just, and we rejoice in their success; but they should be taken soon after the alleged injury.

OUTBREAK OF TYPHUS FEVER IN TRIPOLI.

ONE of those epidemics which in subtropical latitudes make the nearest approach to the mediæval plague has broken out in the Ottoman pashalik of Tripoli and has already caused great mortality, particularly in the plateau of Barca. From the imperfect details that have reached us the symptoms appear to be those of typhus fever—that is, of a continuous pyrexia, with grave disturbance of the nerve-centres, inducing muscular lethargy and mental hebetude, and with an exanthematous display of spots, red or livid, about the fifth day from the beginning of the fever. The immediate causes of this explosion are also withheld, but are not far to seek. In Tripoli the population lives poorly; trade has for some time been depressed; and to the *ensemble* of lowering influences must be added, in the plateau of Barca, the noxious custom of burying the dead within a few inches of the surface of the soil. This latter, usually sandy and always light and friable, had for weeks been inundated with heavy rains, so that the scanty covering of earth was washed from above the corpses and pestiferous exhalations were the necessary consequence. In these circumstances the epidemic has made rapid progress; one-fifth of the inhabitants (who number about one million in all) have been struck down; a large proportion, amongst them the governor of the province, have died; and still the malady gives no signs of abating. A correspondent writes: "The panic is indescribable; the law courts are shut; the shops are deserted; all business is at a standstill; and the European population is in full stampede." We await a duly authenticated medical report of the epidemic and have but to hope that it may not spread to the Mediterranean ports with which Tripoli is in frequent communication—particularly Tunis, Alexandria and Malta.

DEATHS OF EMINENT FOREIGN MEDICAL MEN.

THE deaths of the following distinguished members of the medical profession abroad have been announced:—Dr. David Wiener, author of a "Manual of the Medical Laws of the German Empire," at the age of sixty-seven, at Graudenz.—Dr. Adolf Fischof, formerly a well-known Vienna practitioner. He took part in the "March Move-

ment" in the year 1848. His age was seventy-six and he died at Emmersdorf, where he had been living in retirement for some few years.

DR. EDWARD MAUREL (*Midi Médical*, Sept. 10th and 17th, 1892) concludes from experiments that tuberculin, given in a therapeutic dose and in the usual manner, exerts no sensible action either on leucocytes or red blood corpuscles; and that, consequently, if tuberculin contains the product of the secretion and excretion of the bacilli of tuberculosis, the conclusion may be reached that such products have no apparent action on the formed elements of human blood. From further experiments he also thinks that the leucocytes of man offer an effective resistance to the bacillus tuberculosis, as numerous clinical facts show, and that it is sufficient slightly to attenuate the power of the bacillus (as he did by observing its action under various temperatures) to enable the leucocytes to triumph. These results, he maintains, would seem to justify the consoling thought that we merely require to discover an agent capable of bringing about this slight attenuation in order that we may be able to cure a disease which at present exacts a heavy tribute from humanity.

AT the annual meeting of the Balneological Society Dr. Kallay of Carlsbad, speaking of diabetes, distinguished two forms of the disease—the primary or genuine and the secondary or symptomatic. In the former the presence of sugar and symptoms bear a direct relation to one another and there is no organic disease. Appropriate diet and balneological treatment greatly benefits or cures such cases. In the second form symptoms are independent of the excretion of sugar and depend upon disease of some organ essential to life. Prognosis and treatment, therefore, in such cases depend upon the conditions of the primary malady.

THE London County Council have issued a series of regulations under the Glanders or Farcy Order of 1892 respecting the movement and marking of animals diseased with or suspected of glanders or farcy, and as to the removal of fodder, litter &c., the proper method of cleansing and disinfection in cases of such disease and the removal and destruction of the carcases of animals so affected. The Council have also given notice that any person failing to intimate to the police that he has in his possession or under his charge an animal affected with glanders or farcy will be liable to a penalty of £20.

OUR remarks published in THE LANCET of March 18th with respect to the attitude of the Secretary for Scotland towards the question of county medical officers engaging in private practice have, we hear, been welcomed by our professional brethren engaged in that department of official work in Scotland. Amongst the appreciative notices of our conclusions on this point we have to acknowledge the thanks of the members of the Society of Medical Officers of Health for Scotland, conveyed to us by the hon. secretary of that Society.

AT the next meeting of the Medical Society of London (April 10th) Dr. W. R. Gowers, F.R.S., the Fothergillian medalist, will deliver an address on "Neurology and Therapeutics."

LITERARY INTELLIGENCE.—Messrs. James Elliott and Co., Temple-chambers, Falcon-court, Fleet-street, E.C., are preparing for publication forthwith the whole of the alchemical and hermetic writings of Paracelsus, for the first time completely and faithfully translated into English, with the side-lights of the chief commentators and exhaustive vocabularies and indices. The magnitude of the undertaking will necessitate its issue in the form of monthly volumes, the first of which is now passing through the press.

ON THE ORGANISATION OF MEDICAL RELIEF IN THE METROPOLIS.

BY F. J. MOUAT, LL.D., M.D. EDIN., F.R.C.S. ENG.

IV.

PROFESSOR ERICHSEN in his refined and opportune monograph on "hospital federation for clinical purposes" treats the question in a masterly manner, with a weight and authority which carry conviction, although he puts it forward in the modest garb of a suggestion. His eminence in his own branch of medicine, the commanding positions he has occupied, added to his personal and practical acquaintance with the educational needs of this vast metropolis during the whole of his professional life, invest him with unrivalled authority in all questions connected with the practice and teaching of hospitals. Hence no apology is needed for reproducing his views on this very important subject. He mentions that "in the report of the Royal Commission on a Teaching University in and for London it is stated that the opportunities for clinical instruction that exist in the Metropolis are unrivalled. That this is so admits of no doubt and that these unrivalled opportunities are not utilised to their full extent is equally certain." He proceeds to prove this from his personal knowledge and experience, and shows how injurious it is to the students of medicine at home, who are in consequence compelled to resort to foreign schools of repute to obtain information which exists at our own doors, and only requires to be properly utilised, to place the British school at the head of all others in Europe and America. Is it not possible, he says, to place London not only on a level with, but far in advance of, all other European capitals as a great school of clinical medicine and surgery in the widest sense of clinical teaching, as well as in its more special departments? He believes that by proper organisation of the enormous opportunities for clinical study that exist, but are dormant in London this may not only be accomplished but would place it in the pre-eminent position that it is entitled to, from the professional ability and excellence of its physicians and surgeons.

After specifying the number and nature of the charitable and other institutions within the metropolitan area devoted to the relief of sickness, he alluded to the separate Poor-law infirmaries, of which he expressed a favourable opinion as possessing special merits of their own, and showed that without them the means of providing for sickness amongst the poor were numerically inadequate. He remarked that, as regarded the voluntary institutions, there was another potent factor in raising the standard of gravity for the in-patients of many of the London hospitals. It was their acknowledged insufficiency for all those who sought their aid. Hence a strict process of selection was adopted by the resident officers in the admission of patients, resulting in the admission of only the most severe, urgent and important cases.

The eleven largest general hospitals, with their 4542 beds, their special departments and maternities, he considered by far the most important, "not only on account of the number of beds they contain and the character of the cases that fill those beds, but of the acknowledged eminence, as practitioners and teachers, of the great body of physicians and surgeons attached to them. "Taken collectively and federated together, so that the instruction given in them should be opened to the advanced students, they would constitute a great clinical school of medicine and surgery in all their branches, that would be without an equal in Europe. In this case union is strength. Taken collectively they are superior to all, but their weakness lies in their isolation. The remedy is to be found in the abandonment of the system of isolation that at present exists, and which neutralises the immense and undoubtedly unrivalled opportunities for clinical study that are to be found in the great hospitals and other medical charities of London. For this should be substituted a system of federation for clinical purposes. It is idle to talk of these opportunities as being unrivalled so long as the most important of them are cut up into as many distinct and separate fractions as there are hospital schools in the metropolis, and the remainder are scarcely, if at all, utilised." With a plethora of proof of the same practical character, Professor Erichsen formulated his plan of federation, which is simple, practicable and of moderate cost, and leaves untouched the autonomy of each institution embraced in its circle of action

as a component part of a teaching university, for which London is now well prepared. If adopted, having been emancipated from the fetters of the solitary school to which he is now restricted, the advanced student will find that his horizon is widened. "He will no longer learn *jurare in verba magistri*, but to form juster conceptions of science and to take hereafter broader views in practice than he possibly could when confined to the narrowing influences of the teaching of one set of men and the traditions of one hospital only, and he will be led to form a clear and considerate judgment of men whose opinions, though differing from those of his own teachers, he may yet find not to be entirely erroneous or undeserving of consideration." Of the separate Poor-law infirmaries he formed a just and high estimate as storehouses of vast and varied sources of medical material for clinical purposes, but he hesitated to include them in his scheme of general professional education, lest it might be attended with some difficulties from the nature of their government. I believe that I am able in some degree to supply the missing link in his plan, partly from my personal knowledge of the character and organisation of those excellent and well-managed institutions during the time I acted as the Local Government Inspector in London for Poor-law purposes, whilst my friend Dr. Bridges was employed in a Parliamentary inquiry into the working of the Factory Acts: and in part from the evidence submitted to the Lords' Committee. The origin of these infirmaries was in a great measure due to the action of THE LANCET Commission of 1865 in exposing the defects of the Metropolitan Workhouse Infirmary system, and to the public discussion to which its reports gave rise. This led to the passing of what is known as Gathorne Hardy's Act, the object of which was to remedy the defects of those infirmaries, which were acknowledged officially to be (1) insufficient medical care and nursing; (2) imperfect construction and sanitation; (3) overcrowding; and (4) deficient means of classification. Not only were these defects dealt with in the workhouses themselves to some extent, but the radical remedy of removing them altogether from all pauperising influences in their immediate control and arrangements has been eminently successful.

The testimony of the Lords' Commission on this point is to the following effect. Notwithstanding some objections in matters of detail which were offered in evidence, but did not touch the soundness of the principles underlying them, their lordships observed, "The evidence on the whole appears to indicate a general recognition of the high standard of efficiency attained by the best of the new infirmaries, both in their structure and in their general arrangements and management." There are now, according to Dr. Bridges, twenty-four of these infirmaries and forty-four out-door dispensaries, in addition to the imbecile asylums and fever hospitals under the control of the Metropolitan Asylums Board. In the infirmaries are stated to be 12,445 beds, and in the other institutions referred to some 4700, according to a return in my possession. With two exceptions of the conversion of old buildings, these infirmaries are all on the pavilion plan, and as respects ventilation, drainage and all internal arrangements necessary for the effective treatment and classification of the sick and injured, are far superior to any of the general and endowed hospitals. There is a widespread impression that only chronic and some incurable diseases are contained in them, but this is absolutely erroneous. There is no doubt a considerable proportion of chronic cases either transferred from the voluntary general hospitals or admitted directly, but there is also a very large number of acute cases of most of the ordinary affections prevailing amongst the poor. In fact, the disorders of the classes which come under the operation of the Poor-laws from infancy to old age and natural decay, including every intermediate stage of life, with all the risks to which they are exposed in the busy periods of active life in London, can nowhere be studied with greater advantage than in the infirmaries referred to. In a decennial return furnished to the Local Government Board from one of these infirmaries there were 18,927 admissions of patients, of whom 10,116 were recorded as cured, 2996 improved, 1078 took their discharge prior to cure, 690 were transferred to other institutions, and 4047 died. None were ever sent away to provide beds for other patients, and a very considerable portion of those who succumbed died from old age and natural decay—a class for whom no accommodation exists in general hospitals, rightly enough. In another return of deaths in one year in nineteen Poor-law Infirmaries 998, or 16·3 per cent., died from phthisis; 831, or 13·5 per cent., from chronic bronchitis; 571, or 9·5 per cent., from chronic forms of paralysis; 451, or 7·3 per cent., from senile decay; 362, or 5·9 per cent., from chronic forms of heart disease; and 227, or 3·7 per cent., from kidney disease. In addition to the treatment of cases of acute and chronic disease, important surgical operations are performed in some, and might be in all, of these institutions with almost exceptional success; so that they are to all intents and purposes general hospitals in all but name, yet tainted most unfairly, I think, with the civil disabilities of pauperism from destitution.

With the sanction of the Local Government Board, I collected and published the statistics of 87,726 deliveries in Poor-law Infirmaries, of which 23,117 were in the metropolis, amongst whom the deaths were 0·88 per cent. out of the whole of the Poor-law institutions within the registration area of London. In all the fever hospitals and imbecile asylums under the control of the Local Government Board records are kept which it would occupy too much space to reproduce, but the combination of all the conditions above mentioned shows what a vast amount of means of clinical instruction could be furnished by them, were they included in Mr. Erichsen's federal scheme.

In addition to furnishing immediate medical relief to all cases provided with the requisite official authority, and to any very urgent case which presents itself even without such authority, the two most important considerations connected with the separate workhouse infirmaries, apart from their professional excellence, are the simplicity and efficiency of their management and the economy with which they are worked. The staff usually consists of a resident medical superintendent, with one or at most two qualified assistants, a matron, a steward, and a staff of nurses, who are mostly trained by themselves. The superintendent has undivided control over the whole establishment, and all hands are paid and resident, and devote the whole of their time to their duties. This, I think, is the secret of their success, and accounts satisfactorily for the very large amount of work they are able to perform, with advantage to the sick and economy to the ratepayers. I consider myself entitled to mention my own personal experience upon this question, for I at one time, in the early part of my career, occupied a similar position for some years, when I was the administrative and executive head of a general hospital, attached to a medical school, and containing 500 beds, as first physician and professor of medicine and clinical medicine. I had charge of one hundred of these beds, with a house physician to assist me. It gave me a considerable amount of purely professional work, and I had in addition the administrative charge of a medical school of some 200 or 300 students, a large number of whom were resident. All this I was enabled to get through simply because I was a paid resident responsible officer, and devoted the whole of my time to my duties. The college and hospital were governed by a Council of the Professors, of which I was a member, and all was again under the administrative control of a Council of Education, of which I was likewise a member and secretary. Neither of these bodies ever interfered with the details of management or in the individual personal responsible control of the whole institution, with every branch of which the college council was thoroughly acquainted. They acted as consultative bodies, and the latter carefully inspected the college and hospital at each of its meetings. The accounts and expenditure were audited by the audit department of the treasury. A somewhat similar government to this would be able to exercise a like efficient control over all our voluntary and endowed general hospitals, and more particularly those to which medical schools are attached, without additional cost, without a multitude of self-elected committees between which there is no continuity of action, without unseemly contentions, and without overgrown establishments for which there can be no real need.

As to the introduction of clinical teaching in Poor-law infirmaries and other instituntions, even in existing circumstances there would be no real difficulty if it is properly conducted and is not associated with any schemes introducing an outside element such as consultative honorary physicians and surgeons with a following of their pupils, who would not be under the control of the resident superintendent or of the boards of guardians who are responsible for the management of all the institutions in their several districts. The strong objections formerly entertained by all Poor-law authorities, including the Local Government Board, have nearly died out and are not likely to be revived, provided no proceeding calculated to interfere with their authority and

their public responsibilities be introduced. From my personal knowledge of boards of guardians in all parts of England and Wales and of the institutions under their control and management, I am satisfied that they are actuated generally by the best intentions in the fulfilment of their very important and somewhat unpopular duties; and I found them always disposed to adopt any measures of improvement of the desirability or necessity of which they were satisfied. The institutions themselves are, in many cases, misunderstood, for I have seen much happiness and contentment, particularly amongst the old people, with the kindness and consideration with which they were treated. To regard them as bogies and bugbears appears to me to be as impolitic, as it is unsound in principle. It will never reclaim the really vicious, ill-disposed and incorrigibly idle; it has, I fear and believe, little or no influence on the cultivation of thrift, and is certainly disregarded by the majority of the proletariat in resorting to the Poor-law infirmaries when seriously ill. The stigma of pauperism has no real significance for the professional tramp or incorrigible idler and criminal, but would often act injuriously upon those whose destitution is not due to any vices or acts of their own, but to sheer misfortune and ill success in life, for whom the provision of a quiet retreat is provided by one of the most beneficent Parliamentary measures ever passed—the Poor Law Act of 1824. The extension of the provisions of the Medical Relief Disqualification Removal Act of 1885 to the Poor-law infirmaries (which, by a legal fiction, are constructively parts of a workhouse) would not only be just to the great class of well-conducted artisans and labourers, whose temporary poverty is due to sickness and physical disability alone, and would be a positive gain to the voluntary hospitals, enabling them at once to sift their claimants to admission, and to reject those who are unable to bring proofs of their identity. It would also solve another problem of extreme difficulty, such as the unequal distribution of the voluntary hospitals of London owing to the great shifting of population, thus concentrating them where they are not much needed, and leaving great bodies, particularly of the poor, far removed from hospital aid. To transplant any of the older institutions from their present positions, even if it were practicable, would cause an expenditure for which neither the State, the municipalities, nor private benevolence are in any way disposed or prepared. It, moreover, does not necessitate any expenditure whatever, for a well-ordered Poor-law infirmary is situated in each of the Poor-law districts, and these infirmaries would, as general hospitals for the poor only, with the existing voluntary institutions for the classes immediately above them, be ample for all the hospital wants of London. Their lordships expressed a great desire for a map to guide them in the matter, and were unable to find one. I am unable to understand how this happened, for I placed in the hands of one of them the best map yet constructed, which indicated the exact position of every hospital, Poor-law infirmary, lunatic asylum, and Poor-law dispensary within the metropolitan area. I suppose he must have overlooked it.

Now that the successful character and efficiency of the Poor-law infirmaries are fully established, by a system of affiliation or federation such as Professor Erichsen suggests, all the hospitals could assist each other materially with much advantage and no detriment to any of them, as well as without the sacrifice of any of the principles associated with the proper bestowal of charity, either public or private. There need be no more emptying of beds for any illegitimate purpose; the sick poor who are unable to pay anything for treatment would be able to find immediate admission in all cases requiring it, without any danger of aggravating their sickness by waiting for vacant beds or subscribers' letters; and in all cases taken in their earliest stages would have the best possible chances of recovery and speedy return to their work. If the records and statistics of these institutions were carefully kept on a uniform plan, a flood of light would be thrown upon the value of the work done from the professional standpoint, and upon the management of all affections requiring prolonged treatment, such as cannot be now afforded by the voluntary hospitals. The federation of the hospitals, again, if properly directed and carried out, would materially affect the cost of maintenance, which now fluctuates to an extraordinary and unexplained extent—according to Mr. Burdett from £100 to £30 per bed occupied. Combined action would lead to economy, as seen in the working of the central system of Paris. An official inquiry made into such a plan for the workhouses and pauper schools of the metropolis, the latter of which I conducted, showed how valuable such a proceeding would be; but it was not adopted by the different boards of guardians, who would not then voluntarily combine for any purpose whatever.

In the matter of nurses, the Poor-law infirmaries have shown that they can train them for their own use as well as any of the older institutions which make a traffic of their services for their own advantage, which is a doubtful means of adding to their resources. In the former the matrons, all classes of nurses, and establishment generally, are under the sole control of the superintending medical officer, in consequence of which undivided authority there is a total absence of friction.

With reference to the general introduction of clinical teaching in the Poor-law hospitals, it will have to be carried into effect with extreme care and caution. The existing procedure cannot, I think, be adopted with any chance of success so long as attendance for clinical instruction has no acknowledged place and value in examinations as a necessary qualification for the higher offices of clinical clerks and dressers, and the most coveted positions of house physicians and surgeons, which frequently end in the highest prizes of the practising profession—the medical and surgical staffs of the great hospitals. In these positions, the best men will always come to the front, and acquire the fame and fortunes which are the well-earned accompaniments of an eminence fully equal to that of every other branch of human intelligence and action, although it has not yet led to such social distinctions as are lavishly bestowed upon the Church, the Bar, and the Army and Navy.

The advantages, then, of converting the present Poor-law infirmaries into general hospitals without civil disabilities appear to me greatly to outweigh any objections of principle which can be brought against the proceeding. That State aid can further demoralise or pauperise those who only claim it in times of acute suffering and are entitled to it I cannot understand. That it will discourage or prevent the practice of thrift is still more incomprehensible, as those who have nothing to save cannot in any circumstances put anything by for a rainy day, since "Ex nihilo nihil fit." That it will dry up the existing sources of private charity I do not believe; that such help in sickness should only be given to the deserving poor may be correct in principle, if practicable, but sickness is an inexorable enemy which cannot be vanquished by any speculative measures. It demands immediate aid, however undeserving on moral grounds the recipients may be. Poverty is not a crime and should not be treated as if it were, and the working of the Poor-laws should be acts of beneficence and not of oppression, even in those of its provisions which are necessarily restrictive of personal liberty of action, in the maintenance of order and discipline.

The present practice of the voluntary hospitals militates against the true principles of charity far more than aid in the Poor-law infirmaries would, even if all civil disabilities were removed, for I do not consider the giving of relief, either to out-door or in-door patients, without the production of proper means of identification, to be at all satisfactorily met by any of the processes heretofore adopted. The conversion of the Poor-law infirmaries would not increase, but, if properly carried out, ought to diminish, the pressure upon the rates, and it would not in any way touch the collection or distribution of the Hospital Sunday or Saturday funds. It would entirely stop all such objectionable proceedings as compelling patients to supply their own tea, sugar, or any other articles of personal comfort, and would never sanction the emptying of beds in unrelieved cases, with regard to which I entirely share the views of all foreign observers who have denounced the practice.

The accommodation available for the wants of London in dealing with sickness associated with poverty is certainly insufficient in existing circumstances, and empty beds, whatever their number may be, ought not to exist so long as they are required. Is there no remedy for this? I think there is, and although the suggestion for its amendment may meet now with a chorus of disapproval, it will, I believe, become inevitable in the near future. The present state of public feeling on the subject of the Poor-laws and the wisdom of extending State intervention is decidedly favourable for regulating individual or even collective action where it is more required, as in the case of hospitals, than it was in factories, mines, and other economic undertakings in which it has proved eminently successful. Why, then, should not voluntary hospitals, which are almost all living beyond their available resources and parting

with portions of their capital to meet immediate wants, obtain grants in aid from some such source as a common fund, similar to that which exists in the Poor-law practice of London, or in the Parliamentary grants of Dublin, to enable them to fill their empty beds and to fund their legacies as means of permanent income, which would probably in a few years render them self-supporting and independent of all esoteric aid? Upon this point the Duke of Devonshire, at a meeting held in Chesterfield in October last to raise funds for clearing off a debt on the local hospital, whilst intimating his preference for voluntary contributions when adequate, said "he noticed a great and increasing tendency to throw upon public resources, mainly upon the rates, the support of many institutions supposed to be of advantage and benefit to the whole community, and it did not appear to him at first sight very clear why no such proposal had been made concerning such useful institutions as hospitals. The expenses of public education, and in some places the expenses of free libraries and in providing public parks and other means of recreation for the people, were procured from public resources, and it did not seem clear why such an institution as that hospital should not be supported from the same source." The main contention of this prominent and influential statesman is, I think, correct, and private charities must perforce bear a fair share of the influence of the rapid advances in economic doctrine and practice in the matter of individual, as opposed to collective questions and public control. Collectivism is said to be the leading economic fact of our time. I am by no means sure that the best-intentioned example of this collectivity in relation to hospitals—the Hospital Sunday Fund—has not proved a two-edged weapon, and has not diminished rather than increased the contributions of the general public towards the maintenance of these institutions. It has also injured its position in assuming a commanding influence and officious inquisition into the affairs of the hospitals amongst which its funds are distributed by a standard of its own, which does not, and cannot take note of the real value of hospital work in its technical and professional aspects. This is evident in the feeling exhibited at the meeting recently convened to prepare a working scheme of a central hospital board for London.

It appears to me that it would answer no useful purpose in existing circumstances to examine the other more or less subsidiary matters and conclusions contained in the Lords' report. They are, for the most part, details of administration of which there is need for more exact information than is contained in the evidence for them to be dealt with authoritatively, in addition to which they legitimately admit of diversity of management without any sacrifice of principle. To change or modify them would necessarily be a work of time, and no good would be done by attempting to force upon unwilling authorities measures which do not secure their support and concurrence. The most important of them is the relation of the schools to the hospitals, a question which will enter into entirely new conditions with the establishment of a Teaching University for London, which is probably near at hand. On the question of nurses I had rather not enter. Prolonged as the inquiry was in this matter, no fresh light was thrown upon the training, diet, discipline and duties of this valuable body of hospital helps, and the general treatment of the matter was so far beneath the dignity and purposes of the committee as to be a subject of grave regret. A sensible and practical working solution of the introduction of a uniform system of hospital accounts was framed, and a similar record of hospital statistics in their scientific aspects will not be difficult to discover when the time arrives for its general authoritative introduction.

The remaining link in the chain of my contention is the grouping of the hospitals and other institutions devoted to the care and treatment of the sick poor of London, which will need for its understanding a map of hospital London brought up to date. This I hope to be able to supply.

MR. HORACE LOWTHER of Ventnor has been awarded the grant (fourth time) for efficient vaccination in his district.

MR. T. ANDROS DE LA RUE, the chairman of the Royal Hospital for Diseases of the Chest, City-road, E.C., has sent in connexion with the forthcoming festival dinner a donation of 300 guineas, and Messrs. Thomas De la Rue and Co., of Bunhill-row, have promised 100 guineas.

CHOLERA.

CURRENT NOTES, COMMENTS AND CRITICISM.

FROM the accounts that have been received from Russia, Austria and France there cannot, we fear, be any doubt as to cholera having reappeared with the commencement of this spring, in obedience to those seasonal influences which tend to call forth, revitalise and develop it into activity. Cholera, all the world over, comports itself in much the same way, and its epidemic manifestations occur in obedience to some natural laws which cannot fail to be recognised eventually, notwithstanding that we have as yet been unable to fathom all the factors and reduce them to any scientific formula. There would be no need otherwise to have recourse to figurative language in our descriptions of its epidemic progression. A recrudescence of the disease—in the shape of localised outbreaks and sporadic cases at different places—during this season is the frequent precursor of its epidemic prevalence later on. From Russia we learn that it has broken out in the St. Petersburg district and in the Western Provinces. It is said to be raging in Russian Podolia, whence, according to reports from Vienna, it has been introduced into two villages in Galicia—at Zalucze and Kudrynce on the Russian frontier—by individuals who have lately been in Podolia. Both villages have been isolated to prevent the inhabitants from carrying it elsewhere. A later telegram from Vienna states that cholera has been imported from Russia into another Austrian frontier village and caused 5 cases and 2 deaths. Fears are very naturally entertained that the epidemic in the interior of Russia will manifest itself with renewed intensity when the warm weather sets in. In view of the recrudescence of the disease the Zemstvos are organising a special sanitary corps, consisting of doctors, hospital attendants and nursing sisters for active service, if necessary, in the threatened provinces, and meetings of medical officers are being held in these provinces to devise precautionary and other measures with the same object in view.

According to the latest official returns from St. Petersburg, 65 cases of cholera and 19 deaths occurred in the town of Orel during the week ending March 26th. In the province of Oufa there were, from March 12th to 27th, 84 cases and 29 deaths, whilst in that of Elizabethpol 10 cases and 4 deaths occurred between March 22nd and 29th. The cases and deaths in other provinces not mentioned in the official returns are far more numerous, especially in Podolia and Saratoff.

We learn also from *The Times* that the anticipations of the reappearance of cholera in western Europe this spring are being realised. At Lorient, on the French coast, between Brest and Nantes, it has caused nearly 70 deaths in the course of the last fortnight, and the epidemic is still extending. The type of the disease in France is stated to have been milder than in Russia and Germany, but it is estimated that there have been about 200 cases of cholera in Lorient during the last two weeks. The population of Lorient is about 40,000 and the sanitary condition of the town, as regards water-supply, drainage and cleanliness, if not worse than that of many other provincial towns in France, is nevertheless most unsatisfactory, and the conditions under which the bulk of the population live are favourable, instead of inimical, to the development of any epidemic disease. That this is so is evident from the medical history of the town in connexion with the prevalence of typhoid fever. Lorient is a naval arsenal. The naval forces quartered there during the six years ending 1890, amounting to an average strength of 4000, lost nearly 300 men from typhoid fever, and the small military garrison have also repeatedly suffered from the same disease.

In connexion with the fostering influence of insanitary conditions and their intimate association with the prevalence of epidemic disease, it is a noteworthy fact that a serious outbreak of typhus fever is stated to have broken out in the vagrants' wards of the Nanterre prison, where, it will be remembered, a very severe and fatal outbreak of cholera occurred last year. The disease was traced to individuals who had come from the police depôt at Paris, but the past medical history of the Nanterre institution shows that there must be something radically wrong with the sanitary condition of that institution.

As regards this country we may here advert briefly to the important report which was submitted last month to the Court of Common Council by the Port Sanitary Committee and Dr. W. Collingridge, the medical officer of the Port of London, and adopted by the Court. Her Majesty's Customs have for many years acted as the quarantine authority and have worked conjointly with the port sanitary officers, and it has now been proposed that the two shall be divided and work independently. But Dr. Collingridge pointed out that this would be attended with additional expense and other difficulties, and recommended the continuance of the present system for this year at any rate. He dwelt upon the importance of avoiding any unnecessary detention of vessels and unjustifiable interference with trade, and on the importance of Gravesend, supplemented by other points on the river if necessary, and the use of the telegraph as to the approach of suspected vessels. Dr. Collingridge also proposed the establishment of a small floating hospital, and recommended that £2000 should for the present be placed at disposal for making provision in the port for the transport and isolation of cholera cases &c. if found necessary hereafter.

A notice has since been issued by Sir John Monckton, Town Clerk of the City of London, stating that in consequence of a recent decision of the Commissioners of Customs a separate boarding, for the purpose of the medical inspection of vessels coming into the port of London from the various places abroad which are enumerated, will be made on and after April 1st by the medical officer of the Port of London Sanitary Authority, independently of that made by the officers of Customs. Arrangements have been made to place a hulk off the Port Sanitary Hospital at Denton, below Gravesend, from which the separate boarding and medical inspection of vessels will be made in a steam-launch. Every vessel arriving from any of the specified ports and places will be brought up at the above point until inspected by the medical officer of health of the port.

The Medical Department of the Local Government Board appear to be fully alive to the possible gravity of the situation, for they have already taken, or are taking, steps to inform the Port Sanitary authorities throughout the country of the fact that cholera has again broken out on the Continent. Her Majesty's consul at Brest has informed the Foreign Office of the occurrences that have taken place at Lorient on the north-western coast of France, to which we have already referred. Dr. Thorne Thorne, the medical head of the Local Government Board, is still at Dresden attending the International Conference upon cholera, and is not expected to return to his duties in England for the next three weeks.

CHOLERA IN FRANCE.

(FROM OUR SPECIAL CORRESPONDENT.)

A VISIT TO MARSEILLES.—II.

Futile Litigation.—Bread-making over Open Drains.—An Objectionable Pail System.—Contaminated Wells.

IT need scarcely be said that from time to time the municipality of Marseilles has sought to amend its drainage, not merely by discussing general schemes, but by improving the contrivances in actual use. The latter efforts, though leading to much litigation, have been of little practical service. So far back as Feb. 17th, 1859, a municipal by-law or decree was published forbidding the draining of night soil into the streets, gutters or sewers; yet to this day, as I have already described, there are very few cesspools in Marseilles, and the inhabitants of some 14,000 houses throw their soil into the streets. In 1865 the municipality awoke to the fact that the small cesspits under the causeways in front of the better-class houses were an abomination. They said that these cesspits were only meant to be used as grease-traps, inasmuch as they were intended to receive only rain water and kitchen water—in fact, instead of being small cesspools they were only clumsy and large gullies. But the tribunal, in its verdict, declared that the administration had remained silent for twenty-five years; that the *puisards* had been constructed according to the plan drawn up by the municipality; that similar *puisards* existed in front of buildings belonging to the municipality itself; that, though it was illegal to drain fæcal matter into the sewers, the *puisards* had gratings which permitted only the liquid overflow to reach the sewers; and that, therefore, under these circumstances, the persons prosecuted for draining their closets into their *puisards* must be acquitted. Against this verdict appeal was made, and the municipality even succeeded in causing some persons to be fined, but only one franc each, for the condition in which their *puisards* were found. Whatever may be the law is not very easily ascertained, and this in the face of the many trials and the contradictory verdicts obtained, and the fact remains that the *puisards* are still nothing but small cesspools with overflow pipes to the sewers. The Municipal Commission appointed in 1886 to investigate this matter—after visiting the *puisards* in some of the best streets of Marseilles, notably the Rue Saint Ferréol, where foreign visitors do most of their shopping—reported that: "In the greater number of *puisards* the masonry seemed rough, uncemented and likely to allow a large quantity of liquid to filter through into the surrounding earth. Many were devoid of water. Excremental matter had accumulated at the bottom and was in a state of fermentation, and the gaseous products infected both the sewer and the houses. The houses were also exposed to the gases from the sewer as well as those generated in the *puisards*." This state of things still prevails.

With regard to the *tinettes filtrantes*—that is, the pails, which allow the liquids to escape into the street gutters—the municipality decided that these should be permitted only in houses which had subscribed to the town water-supply. Of course where there is a great quantity of water used the liquid escaping from the *tinettes* is less foul; but it is probable that, in its practical results, this measure has done far more harm than good. It has helped to disguise rather than to prevent the evil. If there is not much water thrown into the *tinettes* the nuisance caused by the overflow would be more offensive and the necessity of employing some other method of drainage would be rendered more evident. On the other hand, the danger is none the less. Cholera dejecta are thrown into a closet and fall down the soil-pipe into a metallic pail. All the water thrown into the closet filters through these dejecta, and passes along the hall of the house into the street gutter. A part sinks into the earth between the paving stones of the gutter, but the rest finds its way to a distant sewer and then into the port. What must be the condition of Marseilles during an epidemic with the water that has filtered through the solid deposits of some 5000 soil-pails flowing down the street gutters? In one house thus drained, and which I visited, I found on one side of the passage that an indenture only had been made in the stone flooring. The pail was under the staircase at the other end of the passage, and along this indenture flowed the befouled liquid which escaped from the pail. On the other side of the passage, within a yard of this open drain and with open doors facing it, there were men actually at work making bread. In another house the tap supplying the drinking water was placed immediately over the open drain. Thus, to fill a jug with drinking water, the jug had to be placed over an open drain within an inch or so of the fæcal matter which, in solution, escaped from the *tinette filtre*, or pail. These *tinettes filtrantes* are, I have already observed, only used where there is a good deal of water consumed in the house; otherwise the water overflow would be abominably offensive, and this, I cannot help thinking, would be an advantage, for persons would then hesitate to draw water and make bread in such close proximity to open drains; they might even go so far as to demand a better system of drainage.

In houses where there is no water-supply the *tinettes filtrantes* are not allowed to be used and the *tinettes sèches* or dry pails are enforced. As already mentioned, the inhabitants have no closet in the house, but have to carry down and empty their utensils into the dry pail. The scavengers are supposed to remove these pails periodically. In practice, if the dry pail is used a great nuisance is created. The pail has no lid and is therefore very offensive. The mouth of the pail is small, consequently soil is constantly spilt outside the pail and infects the cupboard or niche where it is kept. The result is that tenants and others are generally urged not to make any use whatever of the pail. It is kept on the premises to satisfy legal exigencies, but not for use. I visited several houses of this description and found the pails perfectly dry, there was nothing in them. The inhabitants had simply poured everything out into the gutter in front of their houses. There are about 10,000 houses in Marseilles which have dry pails. An official report, bearing the date of

March 1st, 1888, states that, including some suburban districts, there are 32,653 houses in Marseilles, of which 5000 employ *tinettes filtrantes*, 4000 have *puisards*, 10,000 the dry pail or the *tinettes sèches*, and 13,600 houses have no appliance of any kind, and must of necessity throw everything into the street.

There are some houses, however, which possess private drains. During the last fifty years plumbers, when erecting closets in houses built in streets where there were no sewers, sometimes laid small earthenware drains in the street to carry away the slop-water, the overflow from the *puisards* or the *tinettes*, to the nearest sewer. These private drains were laid down without any sort of control or general plan. The greater their number the greater the profits of the builders and plumbers. Thus, in some streets there are as many as five private drains running side by side to the same sewer. Most of these drains are badly built and badly kept. Some are blocked up, others have burst; some do not even reach a sewer, and in many cases the record of their existence has been lost. No wonder that the subsoil of Marseilles is thoroughly contaminated. By far the greater part of what should constitute the sewage of Marseilles travels over the surface of the streets, along gutters that are not cemented, and has, therefore, every facility of sinking into the earth. Yet in this earth, so constantly and widely contaminated, there are wells, and many people prefer the water of these wells because it is cool in summer time. The consequences are often fatal. For instance, some years ago there existed in the Rue Montgrand a boarding-house where some thirty young men daily took their meals. Within one month seven of these boarders were taken ill and five died. The symptoms were most violent and similar in each case. There was a well in this house and leaking cesspools around. The first cases of cholera in 1885 occurred in a house where well water was drunk. It was also noticed that a case of cholera having occurred in the commencement of the Cours Lieutaud, the cholera broke out successively in the Rue Neuve, the Rue Château-Redon, the Rue de l'Académie, the Rue du Musée and the Rue Lorgue des Capucins. In that particular district the disease travelled downwards with the water from street to street, as if the cholera dejecta thrown out in the street on the higher level had infected the people living below.

From all these facts it will be seen that the condition of the domestic drainage is so deplorable as to suffice by itself to account for the high death-rate and the numerous epidemics that afflict Marseilles. This, however, is not all. There remains still much to be said concerning the defective state of the public sewers and water-supply.

OUTBREAK AT LORIENT.

We hear that, upon the receipt at Whitehall of the news that cholera had broken out severely at Lorient, on the French coast between Brest and Nantes, the Local Government Board immediately communicated with all the port and riparian sanitary authorities throughout the country, informing them of the fact. The news of this outbreak is indeed serious, and we sincerely trust that the sanitary authorities will heartily coöperate with the Local Government Board in the energetic steps they are taking to place our defences in proper order. It is true that the trade between Lorient and this country is not large, but there is obviously great danger of the disease shortly spreading to those French ports along the Channel, such as Havre, St. Malo, Cherbourg &c., with which we have frequent communication. The Channel Islands, too, are not unlikely to act as a stepping stone for cholera between France and this country, and in this connexion it is gratifying to learn that Dr. Theodore Thomson is at the present time conferring with the authorities of these islands in reference to the precautions it is desirable for them to take. Lorient has, it appears, a heavy death-rate from enteric fever, and this fact should prove an ominous warning to those districts in our own country which have a high mortality from the same disease.

A CANCER HOSPITAL FOR VIENNA.—Information has been received that Baron Albert Rothschild has given half a million florins for the purpose of founding a hospital for the treatment of persons suffering from cancer. It is understood that the gift is intended to commemorate the death of the late Baroness, who, it will be remembered, died from cancer.

Public Health and Poor Law.

LOCAL GOVERNMENT DEPARTMENT.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

Parish of Chelsea.—The estimated population of this parish in the middle of 1892 was 97,341. The general death-rate amounted to 20·8 per 1000, influenza having caused as many as 84 deaths. The zymotic death-rate was a high one, being 3·1 per 1000, as against 2·6 for London generally. This excess was in a large part due to the epidemic prevalence of measles, no less than 106 deaths having been attributed to it. Dr. Parkes, assuming what is probably the case, that influenza is chiefly responsible for the excess of death-rate from respiratory diseases over the average of non-epidemic years, calculates roughly that there have been sacrificed to this disease during 1892 some 140 lives in Chelsea and about 4200 in London. The quality of the water-supply to Chelsea during the past year is said by Dr. Parkes to have exhibited a considerable improvement on the supply during 1891. We read that in November, at a time when the Thames water was brown and turbid, the Chelsea Company succeeded in removing by filtration 47 per cent. of the organic matter and no less than 99·8 per cent. of the micro-organisms, which can grow on gelatine plates at the ordinary temperature of the atmosphere. It would be interesting to learn what proportion of those capable of growing at the body temperature could be removed by the filter beds referred to. In discussing the subject of filtration Dr. Parkes calls attention to the immense importance of maintaining its efficiency during the present year, as upon that, he states, may depend the immunity of London from Asiatic cholera. It would be instructive if some research could be undertaken to show the behaviour of the comma bacillus in water which had passed through the filter beds of the several water companies of London. As Dr. Parkes points out, experience has shown that cases of cholera can, and do, elude the vigilance of the port sanitary authorities. This is of course a fact which is fully recognised by the Local Government Board, and hence their praiseworthy efforts to stimulate riparian and other sanitary authorities to put their districts in order whilst the opportunity exists. Treating of the housing of the working classes, Dr. Parkes expresses his opinion that a clause is wanted in the Housing of the Working Classes Act, 1891, prohibiting an owner from letting, or permitting to be occupied, any part of a house for which a magistrate has issued a closing order.

Liverpool Port Sanitary Authority.—Dr. Stopford Taylor opens his report by reminding us that in 1866 cholera was introduced into Liverpool by emigrants coming from Germany and that it then caused no less than 1782 deaths. The report tells us that during the prevalence of cholera at Hamburg last year two additional medical officers were appointed to inspect all ships coming from cholera-infected ports. The total number of vessels entering the port during 1892 was 21,687. Of these 5167 were engaged in the foreign trade and 16,520 in the coastwise. Out of this total some 3867 were inspected. Of these 3399 were found in "fair condition" and 468 defective; in 174 cleansing operations were ordered; in 25 the bulkheads were faulty; in 165 there were damaged and useless ventilators; in 66 the closets were out of order; in 38 the decks required caulking. The number of emigrants passing through Liverpool during 1892 was 5632 less than in 1891. The reduction is more than accounted for by the great falling off of passengers to the United States during the cholera scare. It is instructive to read that during the months of August and September the clothing of all transmigrants was fumigated under the supervision of an officer from the United States Consulate, prior to their departure for America. If the fumigation was carried out with sulphurous acid gas the United States has apparently much greater faith in the penetrative power of this gas than we have. Altogether there were fifty-six ships reported during the year 1892 as either having or having had zymotic disease on board, and Dr. Stopford Taylor gives a short account of the measures adopted in each case. We read of several vessels having been disinfected by the crew, but the report does not state how this was effected. In view of Dr. Stopford Taylor's great experience it would have been very acceptable had he given us a short account of the process by which disinfection of vessels is carried out in his port

Kingston-on-Thames Rural Sanitary District.—This report contains a good map of the district to which it refers, and, although it is but a small matter, we must confess that a map, such as this, enables a report to be followed very easily. The district in question had during 1892 a general death-rate of 16·24, a zymotic death-rate of 1·48 and an infantile mortality of 130·4 per 1000 births. Out of 14 samples of water analysed during the year no less than 11 were "largely polluted with sewage" and 2 were "unsatisfactory." It is gratifying to note that the antagonism of the working classes to having their children removed to the isolation hospital is dying out. There were 29 cases of diphtheria in the district during the year and 12 proved fatal. Dr. Gibbes records that he saw several cases of sore-throat in Westongreen, and, although it was impossible to classify them as diphtheria, they were clearly of an infective type. The patients were therefore ordered to be isolated and thus, in Dr. Gibbes' opinion, an outbreak of diphtheria was avoided. We certainly think that the right course was adopted in this case. Dr. Gibbes adds that two of the points which have been impressed upon him during the year are these—that very few of the cases of diphtheria appeared to be associated with defective drainage, and that in the early stage of the disease its "full infective force did not seem to be developed." These are points which are well worth recording. This report, which is a very thorough one, gives a short description of all the watercourses in the district and the steps which have been taken, or ought to be taken, to keep them in a cleanly condition. In connexion with the isolation hospital, Dr. Gibbes makes a statement to which we are not quite able to subscribe—i.e., that the immunity of the nurses and attendants from infectious disease is due to having kept the air of the wards "constantly and thoroughly carbolised." We notice that during the year there were 42 cases of diphtheria, 2 of cerebro-spinal fever, and 2 of typhoid fever admitted into hospital. None of these are diseases which, so far as we know at present, spread aerially, but even if this were so it is doubtful if carbolising the air would act as a preventive. In our experience, the best safeguard as regards the nursing staff is to be found in carefully instructing the nurses as to the usual manner by which the disease is spread, and urging upon them the importance of avoiding unnecessary risks.

VITAL STATISTICS.

HEALTH OF ENGLISH TOWNS.

In thirty-three of the largest English towns 6072 births and 4206 deaths were registered during the week ending April 1st. The annual rate of mortality in these towns, which had increased in the preceding three weeks from 19·6 to 20·9 per 1000, further rose last week to 21·2. In London the rate was 21·0 per 1000, whilst it averaged 21·4 in the thirty-two provincial towns. The lowest rates in these towns were 12·8 in Swansea, 15·3 in Croydon, 15·5 in Hull, 17·3 in Brighton and 18·0 in Nottingham; the highest rates were 26·6 in Wolverhampton, 26·8 in Burnley, 27·7 in Salford, 29·3 in Preston and 29·8 in Bolton. The 4206 deaths included 433 which were referred to the principal zymotic diseases, against 406 and 423 in the preceding two weeks; of these, 119 resulted from whooping-cough, 108 from measles, 65 from diphtheria, 55 from scarlet fever, 38 from diarrhœa, 31 from "fever" (principally enteric) and 17 from small-pox. No fatal case of any of these diseases occurred last week in Swansea, Blackburn, or Huddersfield; in the other towns they caused the lowest death-rates in Derby and Birkenhead, and the highest rates in Portsmouth, Plymouth, Cardiff, Bolton and Preston. The greatest mortality from measles occurred in Hull, Cardiff, Newcastle-upon-Tyne, Portsmouth, Leeds, Preston and Plymouth; and whooping-cough in Norwich, Burnley, Leicester, Liverpool and Manchester. The mortality from scarlet fever and from "fever" showed no marked excess in any of the large towns. The 65 deaths from diphtheria included 36 in London, 6 in Cardiff, 5 in West Ham and 4 in Preston. Five fatal cases of small-pox were registered in London, 3 in Leeds, 2 in Halifax and 1 each in Derby, in Manchester and in Salford; 248 cases of this disease were under treatment in the Metropolitan Asylum Hospitals and 15 in the Highgate Small-pox Hospital on Saturday last. The number of scarlet fever patients in the Metropolitan Asylum Hospitals and in the London Fever Hospital at the end of the week was 2030, against 1147, 1965 and 1971 on the preceding three Saturdays; 235 new cases were admitted during the week, against 195, 180 and 225 in the previous three weeks. The deaths referred to diseases of the respiratory organs in London, which had been 338 and 394 in the preceding two weeks, further rose to 421 last week, but were 56 below the corrected average. The causes of 70, or 1·7 per cent., of the deaths in the thirty-three towns were not certified either by a registered medical practitioner or by a coroner. All the causes of death were duly certified in Portsmouth, Bristol, Oldham, Sunderland, Newcastle-upon-Tyne and in seven other smaller towns; the largest proportions of uncertified deaths were registered in Cardiff, Nottingham, Liverpool, Salford and Sheffield.

HEALTH OF SCOTCH TOWNS.

The annual rate of mortality in the eight Scotch towns, which had been 21·2 and 23·4 per 1000 in the preceding two weeks, declined again to 22·7 during the week ending April 1st, but exceeded by 1·6 per 1000 the mean rate during the same period in the thirty-three large English towns. The rates in the eight Scotch towns ranged from 15·8 in Greenock and 16·5 in Edinburgh to 25·6 in Paisley and 26·8 in Glasgow. The 639 deaths in these towns included 60 which were referred to measles, 17 to whooping-cough, 8 from diarrhœa, 5 from scarlet fever, 5 from "fever" 4 from diphtheria, and 1 from small-pox. In all, 100 deaths resulted from these principal zymotic diseases, against 71 and 104 in the preceding two weeks. These 100 deaths were equal to an annual rate of 3·5 per 1000, which exceeded by 1·2 the mean rate last week from the same diseases in the thirty-three large English towns. The fatal cases of measles, which had been 45 and 51 in the preceding two weeks, further rose to 60 last week, of which 40 occurred in Glasgow, 10 in Dundee, and 6 in Paisley. The 17 deaths referred to whooping-cough showed a slight further increase upon recent weekly numbers and included 15 in Glasgow and 2 in Edinburgh. The fatal cases of scarlet fever, which had been 6 and 10 in the preceding two weeks, declined again to 5 last week, of which 3 occurred in Glasgow. The 5 deaths referred to different forms of "fever" showed a further increase upon those recorded in recent weeks and included 2 in Glasgow. The fatal cases of diphtheria, which had been 6 and 8 in the preceding two weeks, declined to 4 last week. The death from small-pox was registered in Glasgow. The deaths referred to diseases of the respiratory organs in these towns, which had been 136 and 151 in the preceding two weeks, declined again to 138 last week, and were 20 below the number recorded in the corresponding week of last year. The causes of 48, or nearly 8 per cent., of the deaths in these eight towns last week were not certified.

HEALTH OF DUBLIN.

The death-rate in Dublin, which had increased in the preceding three weeks from 25·2 to 26·7 per 1000, further rose to 27·9 during the week ending April 1st. During the thirteen weeks of the quarter ending on Saturday last the death-rate in the city averaged 28·1 per 1000, the rate for the same period being 22·0 in London and 20·6 in Edinburgh. The 187 deaths in Dublin showed an increase of 9 upon the number in the preceding week, and included 7 which were referred to "fever," 3 to diarrhœa, 2 to whooping-cough, 1 to scarlet fever, 1 to diphtheria, and not one either to small-pox or measles. In all, 14 deaths resulted from these principal zymotic diseases, against 12 in each of the preceding two weeks. These 14 deaths were equal to an annual rate of 2·1 per 1000, the zymotic death-rate during the same period being 2·2 in London and 1·2 in Edinburgh. The deaths referred to different forms of "fever," which had been 3 and 8 in the preceding two weeks, were 7 last week. The fatal cases of whooping-cough, which had been 4 and 3 in the preceding two weeks, further declined to 2 last week. The 3 deaths from diarrhœa exceeded the number in any recent week. The 187 deaths registered in Dublin included 26 of infants under one year of age and 50 of persons aged upwards of sixty years; the deaths of infants showed a decline, while those of elderly persons showed a further increase upon those recorded in recent weeks. One inquest case and 2 deaths from violence were registered; and 68, or more than a third, of the deaths occurred in public institutions. The causes of 15, or more than 8 per cent., of the deaths in the city last week were not certified.

THE SERVICES.

MOVEMENTS IN THE MEDICAL STAFF.

SURGEON-MAJOR R. W. FORD has been taken on the strength of the southern district. Surgeon-Captain W. G. Clements has been taken on the strength of the Chatham district and posted to Chatham for duty. Surgeon-Captain F. W. G. Hall has joined at Woolwich for duty. Surgeon-Captain F. T. Skerrett has arrived home from India. Surgeon-Major A. A. Lyle has proceeded to Strensall from York and assumed charge of the Station Hospital and camp, vice Surgeon-Lieutenant G. J. Buchanan. Surgeon-Major Sharpe has been posted to Ireland for duty, and Surgeon-Captain Cardew to the south-eastern district. Surgeon-Lieutenant Thurston, lately attached to the Coldstream Guards, has been posted to the southern district for general duty. Surgeon-Captain Long has arrived at Sierra Leone. Brigade-Surgeon-Lieutenant-Colonel Carew and Surgeon-Captains Melville and Wilson have arrived in the *Crocodile* on completion of a tour of service in India. Brigade-Surgeon-Lieutenant-Colonel Taylor has arrived from India on appointment to the Headquarters Staff at the War Office. Brigade-Surgeon-Lieutenant-Colonel Cuffe has been ordered to Belfast. Brigade-Surgeon-Lieutenant-Colonel Nash will succeed Surgeon-Colonel Jameson as Principal Medical Officer of the army of occupation in Egypt. Surgeon-Major Franklin has embarked for Gibraltar. Surgeon-Captain Walker has joined in Dublin for duty. Surgeon-Captain Weston has been transferred to the southern district.

Surgeon-Lieutenant-Colonel H. H. Stokes having reported his arrival at Netley is posted to the Surgical Division of the Hospital. H.M.S. *Serapis* is expected to arrive at Netley about the 6th inst. with 219 men, 6 women and 10 children for Netley.

The Medical Establishment in Egypt has been augmented by three medical officers and two nursing sisters and a detachment of the Medical Staff Corps.

ARMY MEDICAL STAFF.

The undermentioned Surgeon-Captains retire from the Service receiving gratuities (dated April 5th, 1893):—Wm. Henry Phillips Lewis and Frederic William Reid, M.B. Surgeon-Captain John Francis Bateson, M.B., is seconded for service with the Egyptian Army (dated March 16th, 1893). Surgeon-Major-General J. B. C. Reade, Professional Assistant to the Director-General of the Army Medical Department, having completed the period for which he was granted an extension, will consequently be placed on retired pay. Brigade-Surgeon-Lieutenant-Colonel R. N. Macpherson attains on the 9th inst. the age of fifty-five and will therefore be placed on retired pay from that date.

ARMY MEDICAL RESERVE OF OFFICERS.

Surgeon-Captain Thos. Fort, 6th Volunteer Battalion, the Manchester Regiment, to be Surgeon-Major (dated April 5th, 1893); Surgeon-Captain William Kinnear, M.B., 3rd (Dundee Highland) Volunteer Battalion, the Black Watch (Royal Highlanders), to be Surgeon-Captain (dated April 5th, 1893).

INDIA AND THE INDIAN MEDICAL SERVICES.

The following appointments are announced:—Surgeon-Lieutenant-Colonel R. Exham, Army Medical Staff, to be Secretary to the Principal Medical Officer, H.M.'s Forces in India, sub. *pro tem.*, vice Brigade-Surgeon-Lieutenant-Colonel W. Taylor, M.D., Army Medical Staff, who has been summoned to England for duty in the office of the Director-General, Army Medical Department. Surgeon-Major D. Ffrench-Mullen, M.D., Indian Medical Service (Bengal), Residency Surgeon in Meywar, to be Civil Surgeon of Ajmere and Medical Officer of the Merwara Battalion. Surgeon-Major P. D. Pank, Indian Medical Service (Bengal), Civil Surgeon of Bikanir, to be Residency Surgeon in Meywar. Surgeon-Captain R. Shore, M.D., Indian Medical Service (Bengal), to be Medical Officer of the Meywar Bhil Corps. Surgeon-Captain Shore will continue to officiate as Medical Officer of the Deoli Irregular Force and of the Harowtee and Tonk Political Agency. Surgeon-Captain J. G. Jordan, Officiating Civil Surgeon of Noakhali, to act as Civil Surgeon of Backergunge until further orders. Surgeon-Major A. K. R. Stephens, Officiating Civil Surgeon of Puri, to be Civil Surgeon of Jessore. Surgeon-Lieutenant W. E. A. Armstrong, 1st Regiment Madras Infantry (Pioneers), Indian Medical Service, to the officiating Medical Charge of the Regiment. Surgeon-Captain J. K. Kangs, 17th Regiment Madras Infantry, Indian Medical Service, to the Officiating Medical Charge of the Regiment. Surgeon-Captain W. G. Pridmore, 21st Regiment Madras Infantry (Pioneers), Indian Medical Service, to the Officiating Medical Charge of the Regiment. Surgeon-Captain W. H. Bean, in medical charge, Station Hospital, Cannanore, is posted to do duty, Madras district. The services of Surgeon-Captain T. C. Moore, Indian Medical Service, are placed temporarily at the disposal of the Public Department. Surgeon-Major E. F. H. Dobson, M.B., Civil Surgeon, Goalpara, is transferred to the Khasi and Jaintia Hills district. Surgeon-Captain J. C. Lamont, Indian Medical Service, Bengal Establishment, whose services have been placed temporarily at the disposal of the Chief Commissioner of Assam, is appointed, until further orders, to be Civil Surgeon of the Goalpara district from date of taking over charge from Surgeon-Major E. F. H. Dobson, M.B. Surgeon-Captain H. Handley, Civil Surgeon, Peshwar, has obtained furlough to Europe for one year from April 12th, 1893. Brigade-Surgeon-Lieutenant-Colonel W. H. Climo, Army Medical Staff, has obtained leave for six months on medical certificate, and Surgeon-Captain F. W. Reid, on private affairs from date of availing himself of it, pending retirement.

NAVAL MEDICAL SERVICE.

The following appointments are announced:—Surgeons: William E. Home to the *Swallow* when re-commissioned (undated) and Frederick A. Brice to the Cape of Good Hope Hospital (dated March 29th, 1893).

THE VOLUNTEERS AT NETLEY.

Surgeon-Lieutenant-Colonel Norton and officers of the Volunteer Medical Staff Corps were entertained at dinner on Monday, the 3rd inst., by Surgeon-Major-General Broke-Smith and the officers of the Medical Staff. Drills took place after 2 P.M. for Volunteers. An officer of Volunteers was detailed daily as supernumerary to the orderly officer, Army Medical Staff, and was on duty for twenty-four hours. Half the company of Volunteers were detailed for work in the medical and half in the surgical division of the hospital. The company attended divine service on April 2nd at the hospital chapel. On Monday a grand field day took place with the Hampshire Yeomanry.

PHYSICAL EXAMINATION OF CANDIDATES FOR THE ROYAL MILITARY ACADEMY.

It is announced in *The Times* of the 6th inst. that henceforth only the successful candidates for admission to the Royal Military Academy will be inspected by a medical board and no candidate will be considered eligible unless certified by the board to be in all respects physically fit for Her Majesty's service. No candidate will be admitted to the Academy unless certified by the medical board to be in all respects, as to height and chest measurement, fit for Her Majesty's service, except where the board, having regard to the candidate's age and physique, expressly state that they are of opinion that there is every reasonable probability of his fulfilling the requirements of the service in the particulars referred to at the time of his completing his course of instruction and qualifying for a commission. The admission of such candidate to the Royal Military Academy will only be allowed on the understanding that he will not be granted a commission if he fails to attain the physical standard which may be in force at the time of the entrance examination. The present minimum standard for officers is 5 ft. 4 in. height and 33 in. chest measurement. The medical inspection will be held at the following stations: Colchester, Devonport, Dover, Edinburgh, London, Portsmouth, York, Belfast, Cork and Dublin. Candidates will be allowed to select the stations at which they wish to be medically examined. The decision of the board will in all cases be absolutely final.

THE BULLET-PROOF FABRIC.

This subject is still attracting a good deal of attention in Germany and on the Continent. We strongly suspect, however, that it will be a long time before soldiers go to war as a sort of pastime, owing to the battle-field having been robbed of its dangers by the resistance of the fabrics worn by them to rifle and revolver bullets. Even if the bullets do not penetrate these textures there is the effect of the force of impact to be considered, and we have not yet experimentally ascertained what this will be on living animals encased in a sort of wire-netting covering. As it was very unlikely that Herr Dowe, or anyone else, would act upon Professor Billroth's humorous remark, that it would have been

more satisfactory if the inventor had himself stood up to be fired at, and as no one, even in that case, would be emulous of firing at such a mark, it has been determined to test the properties of the invention by clothing pigs in it and shooting at them. There does not seem to be any doubt, according to the accounts of an expert, Captain Ziegler, that modern rifle bullets are completely stopped by the newly discovered material at a distance of 200 yards; but we have not yet received any particulars as to its weight and cost, or how it is to be worn, or whether it is hot and uncomfortable to wear or not. We shall soon hear, no doubt, what has been the result of the numerous experimental trials that have been instituted with the Lebel and Mannlicher rifles, and until these are published it may be well to reserve our judgment as to what is to be the practical outcome of the alleged invention of a bullet-proof fabric. Meanwhile, Herr Dowe is no longer alone in the field, for he has a competitor—also of Mannheim—named Reidels, and another in the person of an Austrian engineer named Sarneo. The invention is supposed to consist of a kind of light mail and hemp woven together. If it be heavy or at all cumbrous and likely to impede or interfere with the soldier's movements or comfort even, its use will obviously be of a limited kind; and we do not yet precisely know, as we have said, what might be the effect of a rifle bullet projected with enormous velocity when stopped by a resistant structure, as regards shock to the nervous system, bruising and rupture of internal organs and structures of the body generally. The great penetration of a bullet is caused by its high velocity, but the actual impact-effect of bullets of very small calibre on living tissues has yet to be determined. It is possible, if the alleged properties of these newly invented garments be experimentally proved to be well founded, and if their power of resistance to the crushing effect of large and heavy projectiles be also established, that a new material has been obtained for defensive purposes which will altogether alter the aspects of warfare; but, so far as anything is actually known at present, there is much room for speculation and conjecture and but little for assertion based on knowledge and ascertained fact.

SIR JOSEPH FAYRER.

Our service contemporary, the *Army and Navy Gazette*, has an article on the career and services of this officer—whom we are glad to congratulate on being restored to good health and strength after his late illness—advocating that Sir Joseph Fayrer's services should be rewarded, at or before the end of his appointment as President of the Indian Medical Board, by a G.C.S.I. or a K.C.B. Sir Joseph Fayrer originally served in the Navy as an assistant surgeon before passing into the military service. He was at the siege of Palermo and that of Rome in 1847-48 and subsequently in the Burmese War and the Indian Mutiny and siege of Lucknow. Sir Henry Lawrence died in what is historically known as "Fayrer's House" at Lucknow. Sir Joseph Fayrer accompanied the Duke of Edinburgh and subsequently the Prince of Wales on their respective tours through India, and professionally distinguished himself in hospital and other work at Calcutta, so that his career has, at any rate, been sufficiently varied and not wanting in incident.

Correspondence.

"Audi alteram partem."

THE MEDICAL REGISTER.

To the Editors of THE LANCET.

SIRS,—I desire to draw attention to the difference in price which exists between the Medical Register and the Monthly Army List. The first-named book, the widespread diffusion of which is of real importance to the public in guarding them against deception, costs 6*s*. The Army and Navy Lists can be purchased for 1*s*. 6*d*. each. I propose that in addition to the existing large Register, a smaller and more portable edition of it be published quarterly, bound in paper like the Monthly Army and Navy List, and sold at a similar price. Such a book could be annually distributed to a four times greater extent to public officials than the present portly and unportable volume. It could be found in the minor registration offices and the minor police stations. 2. I desire to point out the need of a local index to the Register. One long alphabetical register of the names of all the doctors in the three kingdoms exists, it is true, but one cannot verify names of doctors in localities without a local index, say, of country, county or borough. I am told that the present form of the Register is that laid down by the Act governing registration. Doubtless this is so; but an index is an essential part of any book, and a local index seems to be needful in a book which contains in one long roll the names of the medical men of the three kingdoms and many hundred others practising either officially or privately in countries outside the British Isles. An Army List, with the names of all the officers in one long alphabetical list, would be a dismal and impracticable volume; the regimental grouping and general index solve the difficulty. In the Medical Register a local index would do a similar duty. If I wish to send a patient to a distant town or health resort, why should not the official register give me a borough or county list of the doctors living there? Surely Parliament never meant to veto such a provision. If it did the error needs rectification.

A cheap, widely diffused, frequently corrected register, showing deaths, expulsions, suspensions and local removals of medical men is one of the safeguards needed in a profession which is overcrowded and yet much overworked, which is doing enormous service for the State without recognition or reward by the State, and where unqualified men and adventurers seem to exist absolutely free from check.

I am, Sirs, yours faithfully,

Woolwich, April 4th, 1893. GEORGE EVATT, M.D.

RICKETS IN AUSTRALIA.

To the Editors of THE LANCET.

SIRS,—A few years back you did me the favour to publish in THE LANCET some conclusions at which I had arrived, from clinical observations extending over many years, on the chief cause of rickets in this country. It appeared to me quite clear that the common idea that rickets is due to errors of diet is not supported by clinical experience. I have seen no reason to change the opinions I put forward then, but rather to feel more confirmed in them by subsequent experiences. The object of this letter, however, is not to draw attention to the conclusions above alluded to, but to encourage an independent inquiry into this subject by those who are practising in the Australian colonies. The fact that rickets is a malady that is as rare in its occurrence in those colonies as it is common with us has long been familiar to those who have been able to make comparisons, and the remarks made by Dr. J. C. Verco of Adelaide at the Inter-colonial Medical Congress of Australia in 1887 prove how deeply impressed he was with the singular absence of rickets in Australia and how fully he appreciated the inadequacy of the common theories which pretend to explain the cause of the malady. "There is some secret reason," Dr. Verco remarked, "for this that we have not yet discovered." A few days ago I was favoured with a copy of the second edition of a small work on "Prescribing and Treatment for Infants and Children," written by Mr. Philip E. Muskett of Sydney, and special attention is directed by him to the subject of rickets in Australia. After reading Mr. Muskett's remarks I hope that you will allow me, through the medium of THE LANCET, to suggest to those who may feel disposed to investigate the question of the etiology of rickets in Australia to liberate their minds from the influence of any theories as to their causation and to be contented to observe fully, record accurately and attempt to prove nothing until they have collected their facts. What we want are clinical facts—not opinions.

I am, Sirs, yours truly,

April 3rd, 1893. ROBERT LEE.

"DISLOCATION OF THE PATELLA 'EDGEWAYS.'"

To the Editors of THE LANCET.

SIRS,—Adverting to your correspondent's letter in THE LANCET of April 1st, in which he reports an instance of a rare and interesting dislocation of the patella, namely, dislocation by semi-rotation ("edgewise"), I am reminded of an almost parallel case which came under my care whilst serving on the medical staff of the Army at Shorncliffe. In 1889 a healthy young cavalryman was brought to the station hospital with a report that he had "broken his knee," the

result of a collision on horseback in the riding-school. The patient being examined immediately in bed, one recognised at once the characteristic appearance of the injured knee (right)—the patella obliquely rotated on its vertical axis, firmly wedged in between the condyles, its surfaces directed laterally and its edges in an antero-posterior direction; in addition, one could not help noticing the marked laterally-flattened appearance of the joint, the limb being extended, and an entire absence of the rounded symmetry in the general outline of the knee. The outer edge of the "cap" could be felt projecting like the rim of a plate—a very unmistakable prominence. The patient stated that at the time of the accident he felt very severe pain, but on admission to hospital there was very little pain and tenderness. With the assistance of Surgeon C. G. D. Mosse, reduction was effected by regulated pressure and gradual extension, there being no exaggerated degree of resistance from the extensor tendon or the ligamentum patellæ. The limb was fixed in a back splint and kept absolutely at rest for ten days, an ice-bag was applied, and the patient was ultimately discharged from the hospital fit for duty and with no apparent ill-effect to the joint. I have not been able to ascertain whether he ever experienced a recurrence of this dislocation.

I am, Sirs, yours faithfully,

N. HAY FORBES, L.R.C.P. Lond., M.R.C.S. Eng.

Late Surgeon Army Medical Staff.

Tunbridge Wells, April 3rd, 1893.

"STRANGE INCIDENTS IN PRACTICE."

To the Editors of THE LANCET.

SIRS,—I was very much struck with the article on "Strange Incidents in Practice," by Sir William Dalby, which appeared in THE LANCET of Feb. 4th, as a similar case of loss of speech with ability to communicate in writing came under my notice at the Colonial Hospital about five years ago. My patient was a middle-aged sailor. He gave a vague history of an injury to his head on board ship. He understood everything that was said to him and was a strong and very active man. He could not speak a word and yet was able to communicate in writing without the slightest hesitation. Suspecting that he was malingering, I placed him under the influence of the A.C.E. mixture in order to ascertain if he would speak when going under or recovering from the anæsthetic. I took the precaution of placing a fellow patient in the room when the anæsthetic was given. At a certain stage in the inhalation the patient became voluble; but when he returned to his senses he was found to be still speechless. He continued to be speechless, although he was told that he had talked loudly under the influence of the anæsthetic, for about three weeks, when his speech was suddenly restored. I have met with another "strange incident" in hospital practice—viz., a fishbone in the sac of an inguinal hernia, when operating about three years ago to relieve a strangulation. I was therefore interested in finding that Mr. Hutchinson has lately recorded a similar case. I am, Sirs, yours truly,

Trinidad, W.I., March 19th, 1893. HENRY ALSTON.

"THE TREATMENT OF HÆMORRHOIDS BY THE CLAMP AND CAUTERY."

To the Editors of THE LANCET.

SIRS,—In THE LANCET of March 25th Mr. H. Allingham remarks, with regard to the operation for hæmorrhoids by the clamp and cautery, that "it is at least four times as fatal as any other method of removing hæmorrhoids." This statement also occurs in the last edition of Allingham's "Diseases of the Rectum" (with the trifling variation that there the operation is stated to be six times as fatal).

During the last seven years I have seen many scores of cases of hæmorrhoids operated upon in the manner condemned by Mr. H. Allingham, and in no single case has either death or untoward symptom of any kind occurred. I would therefore venture to suggest to him that he should put before us both the figures and the source from which he obtained them, upon which he bases the statement that he has more than once publicly made. Until that course is adopted I for one cannot consent to look upon the fact as demonstrated. Further on in his letter he says, "Secondary hæmorrhage is likely to occur on the separation of the sloughs caused by burning." This of course as it is put is a mere matter of opinion. I would ask Mr. H. Allingham if he means to infer that, as a matter of fact, it does more frequently occur than when the ligature is used, and if so if he will quote his authority. I can hardly think that he means this inference to be drawn, as he goes on to say that "Tetanus ..... secondary hæmorrhage are almost unknown now." Or does he mean that these terrible evils are the monopoly of the clamp and cautery? Indeed, it seems to me that the acrimony that has been imported into the debate on the relative merits of rival operations has somewhat obscured the pathological common sense of the disputants. Where the difference is from a pathological point of view between clamping the base of a pile and crushing it I have never, I regret to say, been able to see. Similarly, to declare that secondary hæmorrhage is more likely to occur from the separation of superficial sloughs after burning than from the separation of a ligature around the base of a pile is to me an exercise in pathological hair-splitting of which my mind is incapable.

And now, finally, for a few facts. During the past four years it has fallen to my lot to see from 100 to 150 of Mr. Henry Smith's hæmorrhoid cases both during and after the operation. Apart from the fact that none of them had a single bad symptom of any kind, there were three points chiefly remarkable about them: Firstly, the extremely small amount of blood lost, so that in most cases the sheet on which the patient was lying was scarcely even soiled; secondly, the trivial degree of pain afterwards, for I have seen nearly all these patients the same evening as the operation and in only a very small proportion was any opiate required after the patient was put back to bed, and even then it was given more with the object of confining the bowels than of relieving pain; thirdly, the short time during which treatment lasted. The great majority of the patients were up and about in ten days and returned home on the fourteenth. Not half a dozen of the whole number required longer than this. As for the subsequent contraction and the other ills alluded to, Mr. Henry Smith says that they are nowadays, like the excessive pain, purely imaginary. I am by no means an admirer of the "Procrustes' bed" method of treatment; at the same time I am unwilling that a method of treatment that I am convinced is in a very large number of cases entirely admirable should be so persistently decried by those who clearly have not taken pains to make themselves intimately acquainted with it, as witness Mr. H. Allingham's statement some weeks ago that Mr. Smith cut off the pile and then applied the cautery, and Mr. Smith's assertion that he has abandoned that practice for years in favour of simply burning it off. I am as ready to be convinced as anyone, and if the Messrs. Allingham can prove by the statistics of every case that has occurred to them, say, during the last six years, that, as regards freedom from sepsis, pain, secondary hæmorrhage, subsequent contraction, and also as regards duration of treatment, the results obtained by the ligature or the crushing machine are better than those obtained by the clamp and cautery, they will at least have converted me.

I am, Sirs, yours faithfully,

F. F. BURGHARD, M.S. LOND., F.R.C.S. ENG.

Weymouth-street, W.

"OCULO-MOTOR SYMPTOMS IN ORGANIC NERVE DISEASE."

To the Editors of THE LANCET.

SIRS,—In a leading article of April 1st you remark: "If a case of total ophthalmoplegia were observed in which the frontalis and orbicularis palpebrarum were affected whilst the lower facial muscles escaped, the clinical evidence for the hypothesis (viz., that these two muscles are centrally innervated from the oculo-motor nucleus) would be fairly complete. Dr. Andrew Turner has not yet seen or heard of such a case." Such a case has recently been under my care, descended to me, together with his beds at the London Hospital, from the late Dr. James Anderson. Knowing Dr. Hughlings Jackson's interest in nervous disease, I have transferred the case to his care, but I have no doubt that Dr. Turner could see it if he wished. I am in hopes that Dr. Jackson will publish the case in full, and consequently refrain from doing so myself without consulting him on the subject. I am, Sirs, yours faithfully,

Christopher-street, E.C., April 4th, 1893. FRED. J. SMITH.

THE CONDITION OF THE TEETH AS AN INDEX OF THE GENERAL STATE OF HEALTH.

To the Editors of THE LANCET.

SIRS,—The following editorial note appears in the last issue of the *British Journal of Dental Science*:—

"In the House of Commons Mr. S. Smith asked the Postmaster-General whether it was a compulsory rule that candidates for situations, after passing the Civil Service examinations, had to comply with the order of the medical officer to have such teeth extracted as he might require, sometimes as many as six or seven, without any guarantee that they would be then accepted, and whether without the extraction of such teeth they were rejected. Mr. A. Morley said the medical officers were instructed to report officially with regard to the sight, the hearing and the teeth of candidates for appointment, *the state of the teeth being regarded as an indication of the state of the health.*" [The italics are mine.]

There is material for extended comment in the above extract, but at the present moment I only wish to call attention to the italicised words, which, if literally interpreted, contain an error of no small importance. The condition of the teeth is not an index of the general health or powers of endurance of the individual. Every observant dentist is familiar with the fact that many persons of mature years who perhaps have never been in the enjoyment of perfect health and whose powers of endurance are comparatively low have nevertheless excellent teeth. The reverse is also true, many otherwise vigorous and healthy people having teeth of poor structure, which decay rapidly. It is of course true that the early loss of the teeth may lead to serious impairment of the health; but this is an avoidable evil and has no direct bearing upon the subject under consideration. If proper attention to the care of the teeth and efficient dentistry could be secured many candidates for Civil Service examinations having poor teeth might, on the whole, possess better qualifications than some of their successful rivals.

I am, Sirs, yours truly,

J. LEON WILLIAMS, D.D.S., L.D.S.

Bruton-street, W., April 4th, 1893.

AFRICAN HÆMOGLOBINURIC FEVER.

To the Editors of THE LANCET.

SIRS,—Will you allow me to correct a misstatement of the remarks made by me on the above subject which occurs in the report of the meeting of the Epidemiological Society in THE LANCET of April 1st? I did not agree with Dr. Manson "as to the non-malarial nature of hæmoglobinuric fever." On the contrary, I have lately written a thesis to prove that this special form of fever is simply one of the manifestations of African malarial fever. I am not surprised that those who are not familiar with the forms of malarial fever as found in Africa should regard the fever under discussion as belonging to an entirely different class, but I believe that a knowledge of these gained on the spot would point to its obvious connexion.

I am, Sirs, yours faithfully,

CHARLES F. HARFORD-BATTERSBY, M.D. Cantab.

April 4th, 1893.

THE CHLOROFORM QUESTION.

To the Editors of THE LANCET.

SIRS,—The laboriously compiled report of THE LANCET Commission on Chloroform Administration published in your recent issues concludes that "the sequel shows that the method employed had very little influence in determining the result." This conclusion was *a priori* probable, seeing that the principle of administration was in all cases, with the exception of Junker's, the same. In all the chloroform was diluted by adding the air to the narcotic vapour on its passage to the lungs. It is obvious that an exact and constant dilution under such circumstances must be impossible. This fact may perhaps account for and explain the capricious action ascribed to the chloroform, in reality due to the uncertain method of administration. I have never yet been able to understand why the administration of chloroform from a towel should have been called the "open method." Perhaps it was because, there being a space left between the patient's mouth and the cloth, it was thought that plenty of fresh air would enter with the vapour. If so, then the superior density of the chloroform vapour must have been lost sight of. As a matter of fact, it makes very little difference in a quiet atmosphere whether the cloth is held two, four or even six inches from the face. The vapour drops down in a more or less undiluted condition, often choking the patient, who thus finds himself deprived of his normal supply of oxygen. If, on the other hand, the cloth is held lower down or more to one side than usual, or if the room be draughty, the chances are that the patient only gets an occasional whiff of the anæsthetic. The first might be called the "closed" method and the latter the "open" method, but both terms are meaningless. The gist of the question is whether the chloroform is being administered from a controllable or from an uncontrollable reservoir. The only true open method is that in which there is absolutely no impediment to respiration, where the pure air on its passage into the lungs is diluted with a stated and controllable quantity of the vapour, the amount and strength of which can be graduated to suit the individual requirements. Inhalers answering this description have for some time past been on the market, and it is not until their use becomes general that we shall be enabled to ascertain exactly the action of the anæsthetic under given circumstances.

I am, Sirs, yours truly,

April 4th, 1893. SENEX.

*** Our correspondent is mistaken in his assumption that the report of our Commission is concluded. Much yet remains to be published and we hope to continue the report next week.—ED. L.

NORTHERN COUNTIES NOTES.

(FROM OUR OWN CORRESPONDENT.)

Newcastle Nurses' Home and Training School.

DR. PHILIPSON presided at the annual meeting held last week of the Nurses' Home and Training School. The report showed that the staff consisted of sixty trained nurses and ten probationers, and that they had attended in all 586 cases. He referred in high terms to the valuable services of the matron and to the ability and conduct of the nurses, showing that the institution is an acquisition to the city and district.

Small-pox.

There have been no further cases of small-pox at Carlisle, but cases are still reported at Workington, Whitehaven and South Shields. At South Shields placards have been issued calling attention to vaccination, free stations for which have been opened in various parts of the borough.

Newcastle Natural History Museum.

Several important additions have been recently made to this well-known museum, including a fine specimen of the ruffed or Macqueen's bustard, as it is named in England, a native of Persia, Afghanistan, Western India &c., which, strange to say, was found feeding in a field near the coast at Marske-by-the-Sea last October, when it was easily approached and shot. This is the second specimen which has been recorded as taken in England. The first specimen was killed in Lincolnshire in October, 1847, and is now preserved in the York Museum. The Newcastle Museum has also received two kakas or brown nestor parrots, closely related to the keas, which have in recent years become one of the pests of the New Zealand sheep farmers, having acquired, by feeding on the offal at the sheep stations, a taste for mutton fat, to procure which they attack and destroy annually large numbers of sheep.

Scarborough.

At a special meeting of the Scarborough Town Council held last week it was resolved to purchase a field about half a mile from the town at a cost of £1200 for the erection of a permanent hospital for infectious diseases, but the situation is outside the borough boundary and is therefore strongly objected to by the rural sanitary authority. The Seaham Harbour local board have also decided to build a permanent infectious diseases hospital for their town.

Berwick Infirmary and Dispensary.

At a meeting of the governors of the Berwick Infirmary and Dispensary held last week it was stated that 400 patients had been attended to and that there was a satisfactory balance in hand of over £100. At the same meeting it was agreed to

name the remaining unnamed ward in the hospital the "Maclagan Ward," in memory of the late Dr. P. M. Maclagan.

Mr. Mitchell of the Elswick Works, Newcastle, has given a further sum towards the extension and improvement of the University buildings, Aberdeen. The total of Mr. Mitchell's donations amounts to £20,000.

Newcastle-on-Tyne, April 5th.

SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

Medical Graduation.

THE spring examinations in medicine at Aberdeen are finished, and the results have been announced. A large number of candidates presented themselves. Three gentlemen graduated M.D., and over forty passed the examinations for the M.B. and C.M. degrees. One gentleman took the diploma in Public Health, whilst the B.Sc. degree was conferred on no one. Messrs. Ashley W. Macintosh, M.A., and John Matheson, M.A., passed the M.B. examination "with highest honours," whilst Messrs. Alex. Brown, M.A., B.Sc., and Alfred A. Moore graduated "with honourable distinction." The University gold medals were gained by Mr. Alexander Don, M.A. (Fife Jamieson Memorial in Anatomy and Shepherd Memorial for Systematic and Practical Surgery), Mr. Robert Turner, M.A. (Keith for Systematic and Clinical Surgery), and Mr. Ashley W. Macintosh, M.A. (Matthews Duncan in Obstetrics). At the graduation ceremony Principal Sir William Geddes made reference to the munificence of Mr. Charles Mitchell of Newcastle in presenting the University with £20,000 to aid the Building and Extension Fund.

The Medical Education of Women.

For the last seven years medical education has been provided for women in Edinburgh, where the licences of the Conjoint Scottish Colleges of Physicians and Surgeons have been obtainable by them. Now, however, they have received a further concession to their demand for opportunity to secure access to the higher grade of the profession—viz., the M.D. The University Court of St. Andrews have acceded to an application lately made to them, and have, in virtue of the recently enacted ordinances, recognised the lecturers of that school as "lecturers specially appointed" by the University for the instruction of women in medicine. By this act the University have virtually constituted the school an outlying section of St. Andrews University and have empowered the students of that school to matriculate and to present themselves for examination for medical degrees after fulfilling a complete five years' curriculum of study. Moreover, by the association of the College with the Leith Hospital ample clinical instruction is also secured.

April 5th.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Monkstown Hospital.

THE new buildings are now entirely free from debt, and the increased accommodation provided thereby has been fully taken advantage of and has enabled the staff throughout the past year to keep pace with the increased demand for admission. The total amount of contributions received during the year was £1575 9s. 6d., of which the sum of £130 was collected by ladies.

Health of Ireland: December Quarter.

During the last quarter of 1892 the births registered numbered 23,686 or 20·4 per cent., and the deaths 19,043 or 16·4 per cent. The birth-rate was 1·0 per cent. under the average rate for the corresponding quarter of the past ten years, and the death-rate was 0·3 per cent. below the average. The public health, measured by the statistics of mortality during the quarter, was satisfactory. The total deaths from the principal zymotic diseases were 1022, equal to an annual rate of 0·9 per 1000 living. No deaths from small-pox were registered. Measles caused 125 deaths, against 232 for the preceding three months; scarlet fever, 105 deaths, or an increase of 18; typhus fever, 89, or 31 in excess; typhoid fever, 184, against 153; whilst the mortality from whooping-cough was far below the average. Compared with the corresponding quarter of 1891, there was an increase of 84 in the average number of workhouse inmates on Saturdays during the quarter, but a decrease of 1908, or 3·2 per cent., in the average number of persons who received out-door relief.

The Water-supply of Cork.

Mr. Donovan, medical superintendent officer of health, has directed the attention of the Public Health Committee to the contamination of the River Lee, which supplies the city. He states that it is most objectionable to have a dirty stream continuously flowing into the river and discolouring it for several yards in extent, more especially with an open sluice below, through which it more than likely finds its way to the reservoirs without being filtered. Mr. Donovan's report has been referred to the Waterworks Committee.

Home for Protestant Incurables, Cork.

This institution, which has now been in operation for twenty-one years, has proved most successful for the purposes for which it was established. The Home is beautifully situated near Cork and supplies a want which is not met by any of the hospitals which abound in the adjoining city—it is at once a home for treatment and a hospital for the dying. The total receipts for the year were £1365 3s. 3d., of which the sum of £59 11s. 8d. was received from pay patients. The capital invested now amounts to £11,500. The position of honorary assistant visiting physician and surgeon, vacant by the resignation of Dr. Gibson, has been filled by the appointment of Dr. Norman Townsend.

Mr. M. J. Kelly of Castledermot has been placed on the Commission of the Peace for the county of Kildare.

The death is reported of Mr. Robert Saunderson, M.D., M.Ch., which took place at Bella Vista, Edenderry, on the 3rd inst. Deceased was aged seventy-seven.

April 4th.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

French Surgical Congress.

THE seventh session of this Congress was inaugurated on Monday, the 3rd inst., in the large amphitheatre of the Faculty of Medicine, under the presidency of Professor Lannelongue and the vice-presidency of Professor Tillaux, the general arrangements being, as usual, supervised by Dr. Pozzi, the secretary. A large gathering of representative surgeons was present; amongst them I noticed MM. Verneuil (now Honorary Professor of the Faculty of Paris), Baron Larrey, Chauvel (of the Val-de-Grâce Military School), Heydenreich (Nancy), Ollier (Lyons), Boekel (Strasburg), Stevenson (delegate of the British Government), Sir W. Mac Cormac, Reverdin (Geneva), Roux (Lausanne), Jacobs and Lavissé (Brussels), Djemil Bey, Professor of the Imperial Faculty of Medicine of Constantinople, &c. The *clou* of the meeting was the inaugural address of the President, Professor Lannelongue, who, after having made a feeling reference to the scientific services of the late Professor Trélat, drew a striking comparison between the surgery of to-day and that of pre-Listerian times, when timidity on the part of the surgeon and scepticism on that of the public brought about the loss of thousands of valuable lives which the resources of modern surgery would have saved. "C'est que la chirurgie n'est plus à la merci d'un conseil de famille; elle n'est même plus mineure. Elle vient d'entrer dans sa majorité. Une confiance renaissante a fait taire le doute, et l'art, dégagé de toute pensée décevante, servi par tout ce qu'une jeunesse pleine de vie peut avoir de foi, a acquis une puissance d'expansion bien faite pour être l'objet de nos méditations." He recalled the words of the preface to Boyer's work on Surgery (third edition) published at the beginning of the century (1822): "La chirurgie a fait de nos jours les plus grands progrès et semble avoir atteint, ou peu s'en faut, *le plus haut degré de perfection dont elle paraisse susceptible.*" What would Boyer say were he now alive? Modern surgeons, said M. Lannelongue in conclusion, know too much to fall into a like error. Fresh conquests lie within our grasp, new countries remain unexplored beyond the frontier already reached. The actual business of the Congress was then proceeded with, the following being a list of papers read: Dr. Boiffin, of Nantes: Contusion of the Abdomen from a

Kick of a Horse; Intestino-Peritoneal Septicæmia; Indications for Operative Treatment. Dr. Panné (Nevers): A series of Seven Tarsectomies for Equino-varus. Dr. Reynier (Paris): Suppurating Hydatid Cyst with Concomitant Peritonitis; Laparotomy; Recovery. Dr. Martel (St. Malo): Stalk and Ear of Corn in the Male Bladder; Successful Supra-pubic Lithotomy; Presentation of the Extracted Foreign Body. Dr. Tuffier (Paris): Remote Results of Renal Surgery. Dr. Février (Nancy): Resection of the Superior Maxillary Nerve and Meckel's Ganglion by a Temporal Incision for Obstinate Neuralgia of twenty-one years' standing and localised to the second division of the fifth pair. The proceedings of the Congress will be continued every day up to Saturday next inclusively, morning and afternoon sittings being fixed for 9 A.M. and 2 P.M. respectively.

The Frequency of Arterial Degeneration amongst British Soldiers and Sailors: its Cause.

The common occurrence of aneurysms of the large arteries in the ranks of the British army and navy has formed the theme of innumerable communications. Thus in 114 post-mortem examinations conducted at Netley by Davidson atheromatous changes were noted in 22, no fewer than 17 of these subjects having had syphilis. Of 78 non-syphilitic subjects only 4 presented atheromatous degeneration. Another observer, Welch,[1] arrives at the conclusion that syphilis is to be credited with the production of the aortic aneurysms so often to be seen in barrack hospitals. Most British writers agree with Welch and Davidson in holding syphilis, together with alcoholism, responsible for aortic aneurysms. In a lecture recently delivered by Dr. Lancereaux at the Hôtel Dieu, that pathologist traverses these conclusions, and remarks, in reference to Welch's statement, that in sixty-four of his hundred cases of aneurysms of the aorta the first part of the arch was affected; that the lesion was more common amongst men who had passed some time in foreign service, and that the arterial mischief is probably due to malaria and not to alcoholism or syphilis. For many years past M. Lancereaux has taught that the syphilitic virus manifests a special predilection for medium-sized arteries provided with lymphatic sheaths (more especially the cerebro-spinal arteries), whilst the larger vessels, such as the aorta and its principal branches, are generally spared. When in a young syphilitic subject the aorta presents a dilatation *en cul-de-sac*, and the lesion is circumscribed within narrow limits, its syphilitic origin may be admitted; but M. Lancereaux believes that the majority of aortic aneurysms, wanting as they are in the above characteristics, are either due to generalised arterio-sclerosis or to malarial influences (*aortite en plaques*).

An Undescribed Cause of Dystocia.

In a paper appearing in the *Loire Médicale* Dr. Blanc calls attention to a cause of dystocia hitherto unmentioned in treatises on midwifery. The cause resides in the abnormal softness of the fœtal head from arrest of ossification. The practitioner is called to a case where the normal conformation of the pelvis and the equally normal development of the fœtus promise, with the coöperation of good and regular pains, a speedy delivery; but the head makes no progress, uterine inertia supervenes and instrumental aid is necessary to effect delivery. In these cases the incompletely ossified head can be felt by the exploring finger to present an abnormal softness of the bones, parchment crepitation being yielded on pressure, the fontanelles are unusually large and the sutures are abnormally wide. The practitioner has to deal with a soft head (*tête molle*). Irregularity of descent, flexion &c., are the result, and the resistance of the perineal floor is not overcome as by a head possessing the usual firmness. As soon as the diagnosis is made recourse must be had to the forceps.

Congress of the Alienists of France and of French-speaking Countries.

The annual meeting of this Association will be held at La Rochelle from Aug. 1st to 6th. The special subjects of discussion will be Auto-intoxications in Mental Affections and False Evidence by Lunatics in Courts of Justice.

A New Treatment of Area (Alopecia Areata).

In France the above disease is known by the name of *pelade* and its parasitic origin is pretty generally accepted. Dr. Pye-Smith opines that many of these cases of *pelade* are in reality examples of ringworm in its later stages. However that may be, the practitioner will be glad to be made acquainted with the most recent treatment in vogue in Dr. Hallopeau's wards at St. Louis Hospital. When the affection is limited in extent rapid cure is obtained by repeated applications of cantharides solution with daily use of a 90 per cent. carbolic lotion. Where the disease is more diffused (all the hairy parts of the body or the entire scalp) the following lotion gives good results: Alcohol, 100 grammes; essence of turpentine and camphor, of each 20 grammes; corrosive sublimate, 10 centigrammes. Local patches have been successfully treated by M. Hallopeau by the application of essence of wintergreen, which produces no irritation or pain.

April 4th.

[1] On Aortic Aneurysm in the Army, Med. Chir. Trans., 1876.

BERLIN.

(FROM OUR OWN CORRESPONDENT.)

Congress of German Hygienists.

A CONGRESS of German Hygienists met at Dresden on March 24th. At the first sitting Dr. Sturm of Berlin spoke on the nature of personal predisposition and its relation to place and time. He declared the comma bacillus to be a mere plaything, and the part it plays in the etiology of cholera as but small. It produced an effect only in cases of personal predisposition. At the second sitting it was resolved to lay the draft of a "System of Public Hygiene" before the Imperial Government. The Congress also empowered one of its members to prepare a manual of hygiene, to be published at the instance of the Hygienists' League, with a list of the names of its members. There was also a long discussion of the Imperial Epidemic Bill, which was severely criticised. The proposals of the Congress for its modification, including a protest against all measures of disinfection except in the case of dirty linen, are to be forwarded to the German Government. The Congress also expressed the opinion that, if properly treated, cholera is not more dangerous than typhus fever or pneumonia. The Congress relied for the protection of the population against infectious diseases and epidemics upon the introduction of a new system of personal and public hygiene, including the propagation of the knowledge of the laws of health, with a view to the annihilation of the most important cause of disease in individual predisposition. To this end the Congress appointed a committee to draw up a memorial to the Reichstag and the Federal Council. At the same sitting Dr. Hübner of Leipsic stated that he had applied to Count Zedlitz, the last Prussian Minister of ecclesiastical, educational, and medical affairs, with the offer to prove the curability of small-pox; but he had been referred to Professor Koch's experimental hospital, from which he had received the answer that the arrangements of the hospital did not allow Professor Koch to pay regard to individual opinions.

The International Sanitary Conference.

A considerable number of the delegates to the International Sanitary Conference, now deliberating at Dresden, went last week with Professor Koch to see the Nietleben Asylum, near Halle, the scene of a recent cholera epidemic.

An Ophthalmological Society.

An Ophthalmological Society was founded here lately.

Professor Karl Friedrich Rammelsberg, the oldest of the German chemists of mark, received a large number of congratulatory letters and telegrams on the occasion of his eightieth birthday last Saturday.

Dr. David Wiener, Privy Counsellor on Sanitary Affairs, died the other day at Graudenz, aged sixty-seven. He enjoyed a considerable reputation as a writer on forensic medicine and matters of sanitary police. He wrote a manual of the medical legislation of the German Empire and of the States of which it consists, a collection of medico-legal opinions, and contributed to the *German Medical Weekly* and the *Periodical for Medical Officials.*

April 3rd.

CANADA.

(FROM OUR OWN CORRESPONDENT.)

Numerical Increase in the Profession.

THE several teaching bodies report the usual influx of freshmen, the McGill class numbering 110, whilst the total of

medical students in this city is close upon 600. With us, as with you, the complaint is, "the profession is overstocked."

New Hospitals.

In the fall of last year a new hospital was opened in Toronto under the auspices of the Roman Catholic Church. St. Michael's Hospital is under the care of a Mother Superior, with a staff of religious and professional nurses. In Montreal progress is being made in the completion of the Victoria Hospital, additions have been made to the General Hospital, and during the past month a wealthy citizen has donated some $30,000 to establish a convalescent hospital for the city.

Miscellaneous.

The *Ontario Medical Journal* is the last addition to the list of medical publications. The publishers receive a subsidy of $600 from the College of Physicians and Surgeons per annum, furnishing each member with a copy monthly.

The medical men attached to our militia have formed an association with the object of attaining their proper status and rank and the discussion of subjects more particularly interesting to themselves. The first president is Surgeon F. W. Strange of Toronto.

The Royal Medical College, Kingston, which for so many years has been a separate institution, has joined its fortunes with Queen's University as its medical department.

The Toronto Clinical Society is the latest addition to our medical societies, the members being known as Fellows and classed as resident, non-resident and corresponding. The president is Dr. J. Algernon Temple.

March 4th.

AUSTRALIA.

(FROM OUR OWN CORRESPONDENT.)

The Management of Australian Hospitals.

THE hospital question has assumed an acute stage in our two principal cities. The two large hospitals in Melbourne are unable to pay their way, the Sydney Hospital is deeply in debt and the Prince Alfred Hospital, Sydney, is, according to a recent statement of Sir Alfred Roberts, in an "alarming state of bankruptcy." The hospital at Broken Hill has no funds and the committee threaten to close it. The crisis has been brought about by the falling off of the voluntary subscriptions caused by the general depression in trade which is passing over the Australias. Australian hospitals are in the main State institutions. Parliament votes the money to build them and they are supported largely by State grants. The system in vogue in most of the colonies provides that, once built and equipped, the hospital is to be supported by voluntary contributions and aided by a State subsidy equal to the amount of voluntary contribution. The large metropolitan hospitals are treated on a somewhat different plan. They receive a pound per pound State subsidy on their voluntary contributions and, in addition, a substantial sum is yearly awarded by Parliament; they are, moreover, paid a weekly allowance for all patients recommended by the Government medical officers. This special treatment of the large metropolitan hospitals is necessitated by reason of the flotsam and jetsam of the suffering humanity of the colonies being swept into the great cities. Of late, owing to the general mercantile depression, the voluntary subscriptions have enormously decreased, and as a consequence the State subsidies have not been paid. The upset in trade has on the other hand thrown large numbers of workers out of employment and destitution and disease have correspondingly increased. Thus at the very time when the heaviest demands are being made on the resources of the hospitals the directors find themselves compelled to shut up their wards and refuse admittance to the suffering poor.

The Melbourne Hospital has an overdraft of £20,000 at its bankers, the wards are full, the creditors are pressing and there is no immediate prospect of its being able to pay its way. The committee, having been brought face to face with this deplorable condition, have been inquiring into their expenditure, and although no special report has been made it is understood that there have been found many reasons for retrenching. The Sydney Hospital is in a similar position. A few years ago Parliament came to the assistance of the directors and paid off a large overdraft, and now they find themselves again in the mire with an overdraft of £15,000 hanging round their necks. Of late years there has apparently been a great want of economy, and at a recent meeting of the directors the opinion was expressed that the medical staff were to blame "for treating their patients too well" and for ordering too many "extras." It has been suggested that the large increase in the cost of patients is due to the heavy protective tariffs recently imposed in New South Wales, but a close examination of the matter shows that that is not the only cause. This point is well demonstrated by comparing the annual cost of patients in the Sydney Hospital with that of the Newcastle Hospital. This is the largest provincial hospital in New South Wales. It supplies the wants of a mining, manufacturing, agricultural and shipping community of seventy or eighty thousand people and is not excelled by any Australian hospital in efficiency and general results. A return prepared by the late medical superintendent shows that at that hospital the annual cost per patient in 1887 was £64 18*s.* 3*d.* and in 1892 £70 15*s.* 4*d.*; whilst in the Sydney Hospital the same item was represented by £25 10*s.* 9*d.* in 1888, and by £32 13*s.* 3*d.* in 1892. The Sydney Hospital directors have appointed a financial subcommittee to investigate the state of affairs. In the meantime they have set about retrenching by cutting down the salaries of their principal officers. Hitherto the medical superintendent received £500 a year and he was responsible for the efficient and economic working of the institution. The committee's idea of retrenchment is manifestly nebulous. They appear to think that by reducing their chief administrative officer's salary to £300 a year and by appointing—as they must at that salary—a man who will have the status of a senior house surgeon they are making a proper reduction in their large expenditure. With a fairly large experience of hospital management, I venture the opinion that the first step towards economy and efficient administration should be the appointment of a resident medical superintendent with large powers at a salary more nearly approaching £1000 than £500 a year. It will be interesting to watch this new departure at the Sydney Hospital. Two other hospitals that are in great financial straits are the Alfred Hospital at Melbourne and the Prince Alfred Hospital at Sydney. The directors of the Melbourne institution are so deeply in debt that they have had to close nearly half of the free beds and to run the wards on the paying system. There also the medical staff are supposed to be in some way or other the cause of the extravagance, and the directors at a recent meeting passed a special resolution asking the honorary medical officers to assist them in economising. The resolution expressly called attention to the large quantity of stimulants used.

Obituary.

ARTHUR J. CRIBB, M.D. LOND., M.R.C.S. ENG., L.S.A., HIGHBURY.

THE death of Dr. Cribb, at the comparatively early age of fifty-eight, removes from Highbury one of its best practitioners, well-known to the profession of London far beyond his immediate sphere of practice. He had been in practice in Islington for over thirty years, first as the partner of Mr. Macrae of Compton-terrace, he himself then living at Cloudesley-terrace, Liverpool-road, thereafter removing to Compton-terrace and then to Highbury-place. After the death of Mr. Macrae he was joined in partnership by Mr. Malcolm Morris, who since then has devoted himself to another branch of practice. On the dissolution of this arrangement he took into partnership Dr. Phelps, who has continued in the practice till the present time.

The parish of Islington, one of the largest parishes in England, has grown much in the time covered by Dr. Cribb's active life, and his practice extended to all parts of it and beyond. His health, especially for the last fifteen years, was liable to grave and long interruptions. But this circumstance only seemed to call out the intense energy of his character, and as soon as his attacks of illness were over sufficiently to let him step into his carriage he was amongst his patients again. Large practice done under such conditions for thirty years is itself a heroic achievement under which ordinary men succumb very quickly. Dr. Cribb was a graduate of the University of London and used to trace some of

the symptoms of his ill-health to the strain of the examinations for that degree. In practice he was courteous, ready, original and energetic. He was esteemed and beloved by his patients. He had his peculiarities and even his faults like other men; but he had great virtues, which were displayed in all the relationships of life, from those of his family downwards. In the affairs of the parish, of the Church, and of the Parliamentary division, he took an active and intelligent interest. Of late years he had added to his other duties that of Medical Lecturer to the Church Missionary College, Islington. Dr. Cribb was the son of the late Mr. John Jennings Cribb, who practised medicine at Cambridge. Amongst the facts of his earlier history were his education at the Middlesex School and his house surgeoncy at Middlesex Hospital. He was also house surgeon to the Tunbridge Wells Infirmary. For many years after commencing practice he was one of the most active members of the honorary staff of the Holloway and North Islington Dispensary, and up to the time of his death he continued to be one of the most valuable members of the committee. He took much interest in the Society for the Relief of Widows and Orphans of Medical Men, and in other benevolent agencies of the profession. Any notice of Dr. Cribb in our columns would be incomplete without some account of his many illnesses, which were of a somewhat unusual character and which included a history of one or more intense attacks of renal colic, and in later years—say the last twelve or fifteen—attacks of hæmatemesis and melæna, with or without ascites at varying and, latterly, shorter intervals. Throughout the whole of these he was attended, kindly and constantly, by his neighbour Dr. Stokes. At a post-mortem examination the following facts were observed:—The peritoneum was found to be thickened and opaque, with firm adhesions matting the various organs together, and the viscera to the back of the hard abdominal wall, which at points was like a solid plate. The spleen was considerably enlarged. Other organs were apparently healthy. The abdomen was the only cavity examined. The pylorus was of normal size, and no evidence of malignant new growth could be detected. Dr. Cribb leaves a widow, two sons and two daughters to lament his death.

PROFESSOR ALESSANDRO SOLIVETTI.

PSYCHOLOGY is one of the strong points of Italian medicine, and few have done it more credit than the able and industrious vice-director of the great Roman Manicomio and professor of clinical "psichiatria" in the University who died on the 26th ult. Dr. Solivetti had worked long and well in the institution with which he was connected, first under the late lamented Dr. Fiordispini, of whose exemplary career we lately gave some account, and next under Dr. Fiordispini's highly efficient successor. Shortly after graduation he made a round of visits to the leading medical schools of Germany and France, studying particularly their asylum systems and keenly noting anything novel or serviceable in their management. He returned to Rome one of the most accomplished alienists in Europe and for thirty-two years dedicated all his time and means to perfecting the care and cure of the insane in her chief asylum. He was, as already indicated, Dr. Fiordispini's "right-hand man," beloved by his chief and by his staff of assistants, beloved, too, by successive relays of the students, who flocked to his prælections in the "Sapienza." Personally he was a most amiable and agreeable man and he will be long missed by those with whom he lived and laboured in Rome and its province. He was but fifty-seven when he died.

METROPOLITAN ASYLUMS BOARD.—The number of patients remaining in the several fever hospitals of the Board at midnight on April 4th was as follows:—Eastern Hospital, 123 scarlet fever, 51 diphtheria and 4 enteric fever; North-Eastern Hospital, 491 scarlet fever; North-Western Hospital, 157 scarlet fever, 104 diphtheria and 7 enteric fever; Western Hospital, 211 scarlet fever, 36 diphtheria, 1 typhus fever and 7 enteric fever; South-Western Hospital, 213 scarlet fever, 42 diphtheria and 13 enteric fever; South-Eastern Hospital, 247 scarlet fever, 23 diphtheria and 12 enteric fever; Northern Hospital, 526 scarlet fever and 12 diphtheria. There were on the same date 147 cases of small-pox on the hospital ships *Atlas* and *Castalia* and at Gore Farm 99 cases.

Medical News.

EXAMINING BOARD IN ENGLAND BY THE ROYAL COLLEGES OF PHYSICIANS AND SURGEONS.—The following gentlemen passed the Second Examination of the Board at the meeting of the examiners on the 1st inst:—

Anatomy and Physiology.—Arthur C. B. Pierson, Thomas Spencer, Henry Bailey and Ernest J. A. Dodd, students Yorkshire College, Leeds; Edward V. S. Woodford and George E. F. Stammers, Bristol Medical School; Charles S. Dykes, Bristol Medical School and Mr. Cooke's School of Anatomy and Physiology; Daniel Pettigrew and William H. F. Oxley, Sheffield Medical School; Robert D. Cran, William T. Burns and Arthur C. Oldham, Owens College, Manchester; John H. Clements, Mason's College, Birmingham; Edward H. Roberts, St. Mungo's College, Glasgow; John G. McKay, Melbourne University; Frederick J. I. Willey, Melbourne University and Bristol Medical School; George E. Dodson, St. Bartholomew's Hospital; John Gorman, Queen's College, Belfast; John R. Johnson, University College, Liverpool.

Anatomy only.—Alfred A. P. Moffatt, Owens College, Manchester; William E. Maw, Edinburgh University and Yorkshire College, Leeds; Francis R. M. Heggs, John C. Kreale and William F. Tracy, Mason's College, Birmingham; Frederic Anthony, Bristol Medical School; Richard E. W. Jennings, Bristol Medical School and Mr. Cooke's School of Anatomy and Physiology; Edward K. Herring, Middlesex Hospital; Ernest G. L. Goffe, University College; and Oguntola Sapara, St. Thomas's Hospital.

Physiology only.—Herbert England and Herbert Hallam, Sheffield Medical School; Thomas MacDowell, Queen's College, Belfast; Stanley W. Williams, University College, Liverpool; John L. Elliott, Yorkshire College, Leeds; Thomas Jones, Owens College, Manchester; William L. Freer, Mason's College, Birmingham; Edward Fielden, Durham University and Owens College, Manchester.

Nine candidates were referred in both subjects, three in Anatomy only and nine in Physiology only.

Passed on the 3rd inst:—

Anatomy and Physiology.—Percy G. Lodge, student Yorkshire College, Leeds; H. R. Webb Ware, Oxford University; James Tempest, Owens College, Manchester; Stanley Stephens, St. Mary's Hospital; George V. Worsbington, Cambridge University; John H. Fenoulhet, Cambridge University and St. Mary's Hospital; John A. O. Briggs and William R. Stowe, St. Bartholomew's Hospital; Robert O. Moon and William A. Herton, Guy's Hospital; John H. Crowley, Melbourne University and King's College Hospital; Arthur D. Ketchen, University College; William B. Woodhouse and Rupert Wheatley, Middlesex Hospital; Charles R. Keyser, St. George's Hospital; Frederick H. Atkinson and Abraham I. Rozelaar, Charing Cross Hospital.

Anatomy only.—Edmund E. Lloyd, St. Mary's Hospital; John F. Fer ie, St. Bartholomew's Hospital; and Arthur G. Ede, University College.

Physiology only.—Edwyn R. Grazebrook, King's College; Albert V. Moreton, Owens College, Manchester; Charles C. Grummitt, Francis H. Maturin, Robert A. Draper, Cambridge University; John S. Stansfeld, Oxford University; James C. B. Braine-Hartnell, Middlesex Hospital; Alexander Baker, St. Thomas's Hospital; Harvey Hilliard, Charing Cross Hospital; and Sydney Crompton, Mason's College, Birmingham.

Seven candidates were referred in both subjects, nine in Anatomy only and five in Physiology only.

Passed on the 4th inst.:—

Anatomy and Physiology.—William Egan, Albert W. Henly, William M. Jones and Howard Green, students of Charing Cross Hospital; Walter P. Jones and Sidney F. Smith, St. George's Hospital; Nolan Daly, Victor E. Collins, Arthur J. Dolman, Henry T. Hicks, Harry L. Williams and George K. Levick, Guy's Hospital; Michishige Takayasu, Richard W. Western, Allan Warner, Edward H. Sutcliff, St. Thomas's Hospital; Justus M. Schaub, Robert M. Cowie and William B. Bell, King's College; Arthur J. H. Boyton, Alexander B. Tucker and Arthur Heath, St. Bartholomew's Hospital; William G. Savage, University College.

Anatomy only.—Edmund S. Hall and Eric N. Scott, Guy's Hospital; Thomas B. Marshall, St. Thomas's Hospital; Quintin H. Miller, Charing Cross Hospital; and Edward B. Eames, St. George's Hospital.

Physiology only.—Thomas A. Barron and Bernard Rowlands, St. Bartholomew's Hospital; Frederic W. Page, St. Thomas's Hospital; Robert T. Brown, Guy's Hospital; and Daniel B. Bercroft, Charing Cross Hospital.

Three candidates were referred in both subjects, five in Anatomy only and five in Physiology only.

UNIVERSITY OF GLASGOW.—The following have passed the first professional examination for the degrees of Bachelor of Medicine (M.B.) and Master in Surgery (C.M.):—

James Adam, James Francis Agnew, Wm. Allen, John Anderson, M.A., Francis James Barker, M.A., William Stevenson Blair, Henry Broom, John Ritchie Brown, Charles Hodge Cairns, Donald M'Gregor Campbell, Frederick Burdett Cormick, Peter Latimer Leitch Craig, M.A., John Crawford, John Arthur Clarke Doonan, Charles Elphinstone Fleming, Joseph Green, William Hansen, George Hanson, Arthur Holt, Gavin Dalzell Hunter, Edwin Brook Jago, Frederick James Jayne, James William Johnstone, Archibald Livingston, John Lunn, John M'Ewan Manford, M.A., James Andrew Dixon Mulholland, Donald Munro, Neil M'Callum, John Allan Craigie Macewen, Edward Mackay, Wm. Jones Mackinnon, Alexander M'Donald Nevin, William John Orr, James Malloch Robertson, John James Robertson, John Neil Robertson, William Kerr Russell, James Smith, Henry Hyslop Thomson, Joseph Milton Thornley, Charles Kirk Toland, Harry Muir Watson, Herbert Yearnshaw.

Women Candidates.—Kate Isabel Clutterbuck, Edith Ellen Goodrich, Mary Philip Graham, Norah Kemp, Elizabeth Dorothea Lyness, Madge Speirs Maclean, Mary Roe Riddall, Roberta Henrietta M. Stewart

The following have passed the under-noted portions of the first professional examination for the new degrees of Bachelor of Medicine (M.B.) and Bachelor of Surgery (Ch. B.) :—

1. *In Botany and Physics.*—George MacLellan Blair, William Adam Burns, John Laird Simpson, Matthew Logan Taylor.
2. *In Botany and Chemistry.*—Andrew James Smith.
3. *In Zoology and Physics.*—Robert Carswell, M.A.; Walter Scobie Findlay, M.A., Dugald M'Kinlay, James M'Queen, M.A., James M'Whir, Robert Wylie.
4. *In Zoology and Chemistry.*—David Louis Cairns, Francis James Charteris, James Duncan Cochran, Samuel Macfarlane Sloan.
5. *In Physics and Chemistry.*—Douglas Swan.
6. *In Botany.*—Alexander Smith Allan, Murdoch Macdonald, William Wyper.
7. *In Zoology.*—James Strang.

Women Candidates.—In Physics and Chemistry.—Mary Gardner, Jessie Hawkesworth Smith

The following have passed the second professional examination for the degrees of Bachelor of Medicine (M.B.) and Master in Surgery (C.M.) :—

Robert Aitkenhead, Arthur Roland Anderson, John James Anderson, Thomas Angus, Alexander Blair, James Boyd, William Burns, James Souter Christie, Allen Aiken Clark, James Donaldson, John Sharp Douglas, John Drummond, Richard John Edwards, Wm. Bickerton Edwards, Samuel English, Daniel Ferguson, Albert Alfred Finkelstein, James Forrester, Andrew Fleming Galloway, John Guy, James Henry, Francis Robert Hill, John Affleck Hope, Albert Barnes Hughes, John Hunter, David Kerr, William James Kerr, William Henry Lang, Arthur Lawton, David Lewis, James Duncan Love, James William Otto van Millingen, John Morton, George Bain Murdoch, John Murray, Daniel M'Coll, William M'Cormick, Donald MacDonald, John M'Laws, Moses Neil MacLay, Samuel M'Lean, Farquhar Macrae, Archibald Russell Oliver, Wallace Ainsworth Pride, Daniel Richmond, Alexander Shearer, Hugh Stevenson, James Stewart, Ernest Frederick Docetti Walker, James Walls.

Women Candidates.—Alice Lilian Louisa Cumming, Margaret Cochran Dewar, Marion Gilchrist.

SCHOOL OF PHYSIC, TRINITY COLLEGE, DUBLIN.—Prize Examination in Medicine: First prize, David F. Walker; second prize, Michael J. Smith; first honours, William S. Haughton and R. Travers Smith.

MEDICAL MAGISTRATE.—The Lord Chancellor, on the recommendation of Lord Rothschild, has appointed Mr. S. Osborn, F.R.C.S., a magistrate for the county of Bucks.

TYPHOID FEVER AT MOSTYN.—Some alarm has been created by an outbreak of typhoid fever at Mostyn, in a district of which at least eleven cases have already been reported. Energetic measures have, under the advice of Mr. James Williams, medical officer of health, been at once adopted.

ROYAL BRITISH NURSES' ASSOCIATION.—On the 5th inst. a meeting was held at Edinburgh for the purpose of receiving a deputation from this Association in favour of a proposition to establish at Edinburgh a branch of the society. Dr. Bezly Thorne and Dr. Bedford Fenwick spoke on behalf of the Association and explained its objects. On the motion of Sir Douglas Maclagan, seconded by Dr. Underhill, it was resolved that a Scottish branch of the Association be formed at Edinburgh. Some discussion arose on the question as to whether one year's training in hospital, with a subsequent connexion of two years in a training institution, should not be considered sufficient, and this view, on the motion of Dr. Peel Ritchie, was recommended for adoption by the London authorities.

FORFARSHIRE MEDICAL ASSOCIATION.—At a quarterly meeting of the members of this Association, held at University College, Dundee, Dr. Rorie, the President, spoke of the loss sustained by the Society by the death of Dr. Macleod, who had been one of its most active members, and who for four years had acted as treasurer. The secretary was instructed to record an expression of regret in the minute-book. Dr. Pirie then showed a typical case of Pseudo-hypertrophic Paralysis, which had been previously exhibited to the Association. Several pathological specimens were then brought before the members. Dr. Kynock showed a Three Months' Pregnant Uterus and Appendages removed from a patient who had died of acute tuberculosis; Dr. Rorie exhibited specimens of Bony Spicula in the Dura Mater from two epileptic patients; Dr. Mackie Whyte showed the Liver, Spleen and Kidneys from a case of waxy disease and also specimens of Aneurysms. Finally, Dr. McGillivray showed a series of Ophthalmic cases, and read notes of three cases of Metastatic Purulent Choroiditis.

THE annual meeting of the National Health Society, for the distribution of medals and certificates to the successful competitors at the Society's Medal Examination, is arranged for June 3rd at Grosvenor House, by the kind permission of his Grace the Duke of Westminster, who, with the Duchess, has consented to be present.

FOOTBALL CASUALTIES.—A youth whilst playing a game, on the 27th ult., at Stockton Heath, Warrington, fractured his arm. On Saturday last, during a League match, at Burnley, a goal-keeper sustained an injury to the face, part of the cheek-bone being "splintered;" he was removed to the Burnley Hospital. On the same day, in the course of a match in Nelson's Field, Low-road, Hunslet, a youth, aged seventeen years, fractured his leg, and was conveyed to the Leeds Infirmary. On Monday last, at Hanson-lane, in a match Halifax against Hull, a player fractured his clavicle.

NOTES IN PARLIAMENT.

Death Certification.

THE Select Committee of the House of Commons appointed on the motion of Dr. Cameron to inquire into the question of death certification met on the 29th ult. to select a chairman and arrange the method of procedure. The choice of chairman fell upon Sir Walter Foster, Parliamentary Secretary to the Local Government Board, Dr. Cameron being the member who proposed him. It was arranged that the first meeting of the Committee for the hearing of evidence should be held on Friday, April 14th, and that thereafter there should be meetings twice a week, on Tuesdays and Fridays. In the first instance inquiry will be directed to the present state of the law as to registration and burial and afterwards to suggested improvements. The members nominated to the Committee are Sir Walter Foster (chairman), Mr. Arch, Mr. Brookfield, Dr. Cameron, Dr. Farquharson, Mr. Hozier, Mr. Heywood Johnstone, Sir Thomas Lea, Mr. MacNeill, Sir Stafford Northcote and Sir Henry Roscoe. The Committee have the usual powers "to send for persons, papers and records."

The Oldbury Vaccination Cases.

After the recess Mr. Hopwood will address a series of questions to the President of the Local Government Board with reference to the alleged cases of injury by vaccination at Oldbury, in the West Bromwich Union. Mr. Hopwood's immediate purpose is to secure for the benefit of the board of guardians a copy of the report on the subject made by Dr. Acland to the Royal Commission on Vaccination. His information is to the effect that the report, though repeatedly asked for, has been refused.

Resumption of the Session.

After an Easter holiday of less than a week the House of Commons resumed its work on Thursday, when there was a very large attendance of members. The House of Lords does not meet until Tuesday, the 18th inst.

Seamen's Provisions Bill.

In view of the Committee stage of this Bill, a large number of amendments have been placed upon the notice paper of the House of Commons. Mr. Lawrence has given notice of two new clauses. One is to the effect that in case the supply of butter, marmalade and jams, or any of them runs short, or it is impossible to procure them, one pound of salt meat and one pound of preserved meat may be issued in lieu of the full rations of these articles and proportionately for lesser rations. The other is to the effect that it shall be lawful for the master and crew to mutually agree at any period for substitutes other than those provided in the schedule of the Bill. Mr. Havelock Wilson has drawn up a new clause providing that the Bill shall not apply in certain circumstances to Asiatics or Africans or to ships where, by mutual consent, no food is provided for the crews, but an allowance of money given weekly as an equivalent.

Appointments.

Successful applicants for Vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward it to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week for publication in the next number.*

ALLEN, JAMES, M.R.C.S., L.S.A. Lond., L.R.C.P., L.M. Edin., has been reappointed Medical Officer of Health for the Bollington Urban Sanitary District.

ARMSTEAD, H. W., M.R.C.S., L.R.C.P., has been appointed Senior House Surgeon to St. Bartholomew's Hospital.

BASHALL, C. E., L.R.C.P., M.R.C.S., has been appointed Assistant House Surgeon to the South Devon and East Cornwall Hospital, Plymouth.

BATES, J. CURLING, M.R.C.S., L.R.C.P. Lond., has been appointed Medical Officer to the Croydon Board of Guardians for the Norwood District.

BRIDGES, E. C., M.R.C.S., L.R.C.P., has been appointed Junior House Physician to St. Bartholomew's Hospital.

BROWN, R., M.R.C.S., L.R.C.P., has been appointed Extern Midwifery Assistant to St. Bartholomew's Hospital.

BUCK, A. H., M.R.C.S., L.R.C.P., has been appointed Junior House Surgeon to St. Bartholomew's Hospital.

BUTTAR, C., M.B. Cantab., has been appointed Junior House Surgeon to St. Bartholomew's Hospital.

CHADWICK, J., M.R.C.S., has been appointed Medical Officer for the Township of Butterworth, vice Ogden, resigned.

CLARKSON, W., L.R.C.P. Edin., L.F.P.S. Glasg., has been reappointed Medical Officer for the Eighth Sanitary District of the Morpeth Union.

COOK, J. W., M.D. Aberd., M.R.C.S., has been reappointed Medical Officer of Health for the Tendring Rural Sanitary District.

CORRY, WILLIAM, M.D., Ch.M. Irel., D.P.H. Camb., has been appointed Health Officer for the Shire of Creswick, Victoria, Australia, vice Allen, deceased.

DIXON, F. J., M.B. Cantab., has been appointed Senior House Physician to St. Bartholomew's Hospital.

DODSWORTH, F. C., L.R.C.P. Lond., M.R.C.S., has been reappointed Medical Officer of Health, Chiswick.

DUNN, R. A., M.R.C.S., L.R.C.P., has been appointed Senior House Physician to St. Bartholomew's Hospital.

ECCLES, H. A., M.B. Lond., has been appointed Senior House Physician to St. Bartholomew's Hospital.

ECCLES, W. M'ADAM, M.B., B.S. Lond., F.R.C.S. Eng., has been appointed Surgeon to the St. Marylebone Dispensary.

FENTON, JAS. L., M.B., C.M. Edin., has been appointed Health Officer, *pro tem.*, for the Shire of Bright, Victoria, Australia, vice Wilkinson.

FUSSELL, E. F., M.B. Aberd., M.R.C.P. Lond., has been reappointed Medical Officer of Health, East Sussex.

GIBSON, C. G., M.B., C.M. Edin., has been reappointed Medical Officer of Health for the Launceston Rural Sanitary District.

HALL, J. BASIL, M.A., M.B., B.C. Cantab., has been appointed Resident Casualty Officer to the Leeds General Infirmary, vice Thompson, resigned.

HANNAH, NATHAN, L.R.C.P. Edin., L.F.P.S. Glasg., has been reappointed Medical Officer of Health for the Abram Urban Sanitary District.

HARPER, J. R., L.R.C.P. Lond., M.R.C.S., has been appointed Medical Officer for the Bishopstawton, Landkey, Swymbridge and Stoke Rivers Sanitary District.

HASWELL, N. R., M.R.C.S., has been reappointed Medical Officer for the Helston Rural Sanitary District.

HEPBURN, H. L., M.B. Lond., has been appointed Junior House Surgeon to St. Bartholomew's Hospital.

HOGARTH, R. G., M.R.C.S., L.R.C.P., has been appointed Senior House Surgeon to St. Bartholomew's Hospital.

HOOPER, F. L., M.R.C.S., L.S.A. Eng., has been appointed Health Officer for the East Riding of the Shire of Mornington, Victoria, Australia, vice Sturdee, resigned.

IDDON, W. H., M.B. Lond., M.R.C.S., has been appointed Medical Officer for the Birkdale Sanitary District of the Ormskirk Union.

JONES, W. B., M.B. Lond., has been appointed Junior House Surgeon to St. Bartholomew's Hospital.

KNOX, J. J., M.A., M.B., B.C. Cantab., M.R.C.S., L.R.C.P. Lond., has been appointed Medical Officer and Public Vaccinator for the Molesey District of the Kingston Union, vice Skimming, resigned.

M'CREADIE, WM., M.B., C.M., M.R.C.P. Eng., D.P.H., has been appointed Physician to Leith Hospital, vice Brown, resigned.

MILLER, J., M.R.C.S., L.R.C.P., has been appointed Junior House Physician to St. Bartholomew's Hospital.

MORRIS, R. B., L.S.A., has been appointed Assistant Medical Officer at the Monsall Fever Hospital.

OLIVE, E. J. P., M.B. Cantab., F.R.C.S., has been appointed Senior House Surgeon to St. Bartholomew's Hospital.

PATERSON, H. J., M.B. Cantab., has been appointed Junior House Surgeon to St. Bartholomew's Hospital.

POGSON, W., F.R.C.S., L.R.C.P.E., has been reappointed Medical Officer of Health for the Leeds Rural Sanitary District.

POMFRET, H. W., M.D. Vict., Ch.B., L.R.C.P. Lond., F.R.C.S., has been reappointed Surgical Registrar at the Manchester Royal Infirmary.

RAWLINGS, H. E., L.R.C.P. Irel., M.R.C.S., has been appointed Medical Officer of Health for the Rural Sanitary Authority of the Gower Union, vice Jones.

RENTON, GEORGE, M.D. Edin., has been appointed Medical Officer of Health for the Consett Urban Sanitary District of the Lanchester Union.

REYNOLDS, H. D., L.R.C.P., L.M. Edin., M.R.C.S., has been reappointed Medical Officer of Health for Pembroke Dock.

ROBINSON, G. D., M.D. Lond., has been appointed Resident Midwifery Assistant to St. Bartholomew's Hospital.

ROTH, FELIX, M.R.C.S., L.R.C.P., has been appointed House Surgeon to St. Mary's Hospital, London, W., vice Eyre.

SEQUEIRA, JAMES HARRY, M.D. Lond., M.R.C.S., L.R.C.P., has been appointed Assistant Demonstrator of Anatomy at the London Hospital Medical College, vice Tonks, resigned.

SHIVES, J., M.D. Aberd., L.R.C.S., L.M. Edin., has been reappointed Medical Officer of Health for the Liversedge Urban Sanitary District.

SOUTH, RICHARD ERNEST EDWARD, has been appointed Surgeon-Lieutenant to the Second Volunteer Battalion Lincoln Regiment. Dated March 18th, 1893.

STACK, G. H. E., M.B. Cantab., has been appointed Ophthalmic House Surgeon to St. Bartholomew's Hospital.

STUBBS, J. D., M.B. Cantab., has been appointed Senior House Physician to St. Bartholomew's Hospital.

TATE, WALTER W. H., M.B. Lond., M.R.C.P., has been appointed Physician to the Out-Department at the Samaritan Free Hospital for Women and Children.

THOMAS, A. H., M.B., C.M., Edin., B.Sc. (Pub. Health) Edin., has been appointed Medical Officer of Health for Vancouver, British Columbia.

THOMPSON, GEOFFREY W., B.A., M.B., B.C. Camb., M.R.C.S., L.R.C.P. Lond., has been appointed House Surgeon to the Children's Hospital, Nottingham.

THOMPSON, WALTER, F.R.C.S. Eng., has been appointed Resident Surgical Officer to the Leeds General Infirmary, vice Moynihan, resigned.

THORNE THORNE, B. B., M.R.C.S., L.R.C.P., has been appointed Junior House Physician to St. Bartholomew's Hospital.

TREVELYAN, E. F., M.D., B.Sc. Lond., has been appointed Pathological Curator to the Leeds General Infirmary.

TROUTBECK, H., M.B. Cantab., has been appointed Junior House Physician to St. Bartholomew's Hospital.

WEIR, H. A., M.R.C.S., L.R.C.P., has been appointed Senior House Surgeon to St. Bartholomew's Hospital.

WHITEHEAD, ARTHUR L., M.B. Lond., has been appointed Resident Ophthalmic Officer to the Leeds General Infirmary.

WILLS, W. A., M.D. Lond., M.R.C.P., has been appointed Honorary Physician to the St. Marylebone General (Welbeck-street) Dispensary.

WITHERS, F. E., M.R.C.S., L.R.C.P., has been appointed Senior House Surgeon to St. Bartholomew's Hospital.

Vacancies.

For further information regarding each vacancy reference should be made to the advertisement (see Index).

BATH GENERAL OR ROYAL MINERAL WATER HOSPITAL.—Resident Medical Officer (unmarried). Salary £100 per annum, with board and apartments in the hospital.

BIRMINGHAM GENERAL DISPENSARY.—Resident Surgeon, for the Highgate Branch. Salary £150 per annum, with an allowance for cabhire, and furnished rooms, fire, lights and attendance.

CITY OF LONDON HOSPITAL FOR DISEASES OF THE CHEST, Victoria-park, E.—Pathologist. Salary 100 guineas per annum. Apply to the Secretary at the Office, 24, Finsbury-circus, E.C.

COUNTY ASYLUMS, Gloucester.—Third Assistant Medical Officer. Salary £105 per annum, with board, lodging and washing, but no intoxicants.

CUMBERLAND INFIRMARY, Carlisle.—Assistant House Surgeon, for one year. Salary £40 per annum, with board, lodging and washing.

EAST LONDON HOSPITAL FOR CHILDREN, Glamis-road, Shadwell, E.—House Physician. Board and lodging provided.

HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, Brompton.—House Physicians.

LIVERPOOL STANLEY HOSPITAL.—Assistant Honorary Physician.

MILLER HOSPITAL AND ROYAL KENT DISPENSARY, Greenwich-road, S.E.—Junior Resident Medical Officer, for twelve months. Salary £30 per annum, with board, attendance and washing.

NORTH-WEST LONDON HOSPITAL, Kentish Town-road.—Resident Medical Officer, for six months. Salary £50.

NORTH-WEST LONDON HOSPITAL, Kentish Town-road.—Assistant Resident Medical Officer, for six months. No salary.

PLYMOUTH ROYAL EYE INFIRMARY.—Honorary Surgeon.

ROTHERHAM HOSPITAL AND DISPENSARY.—Assistant House Surgeon, for six months. Rooms, commons and washing provided in the hospital.

ST. PANCRAS AND NORTHERN DISPENSARY, 126, Euston-road.—Resident Medical Officer. Salary £100, with residence and attendance. Applications to be sent to the Hon. Sec., 23, Gordon-street, Gordon-square, W.C.

THE COPPICE, Nottingham.—Assistant Medical Officer (unmarried). Salary £120 per annum, with furnished apartments, board, washing and attendance.

Births, Marriages and Deaths.

BIRTHS.

MCDONALD.—On March 29th, at Egbert-street, St. George's-road, N.W., the wife of William J. McDonald, L.D.S. Eng., of a daughter.

MANTLE.—On March 27th, at Savile-place, Halifax, the wife of Alfred Mantle, M.D., of a daughter.

WIGAN.—On March 28th, at Portishead, Somerset, the wife of Charles A. Wigan, M.D., M.R.C.S., of a son, prematurely.

MARRIAGES.

GREENE-MORRIS.—On April 5th, at St. Mary's Church, Putney, Henry Bertram B. Greene, M.R.C.S. Eng., L.R.C.P.I., of Wandsworth, to Julia Adelaide, third daughter of Austin Morris, Esq., Civil Service of Parkfield, Putney.

TARGETT—JEFFERY.—On April 5th, at Donhead, St. Andrew, Wilts, James Henry Targett, M.S., F.R.C.S., of St. Thomas's-street, London-bridge, to Catherine Sarah, third daughter of James Jeffery, Esq., of Donhead.

DEATHS.

CRIBB.—On Good Friday, at Highbury-place, N., Arthur John Cribb, M.D. Lond., aged 58.

CROSS.—On the 27th ult., at Madeira, Robert Cross, M.D., of Berkeley-square, in his 85th year.

FOX.—On April 4th, in his 46th year, Richard Dacre Fox, M.R.C.S., F.R.C.S.E., late of Manchester.

HAYCOCK.—On the 31st ult., at Claremont, Crouch-hill, George Haycock, M.R.C.S. Eng., L.S.A., of No. 79, Clarence-road, Clapton, aged 74.

JESSOP.—On the 1st inst., Isabella Harvey, wife of T. R. Jessop, F.R.C.S., 32, Park-square, Leeds, and Roundhay Mount, Roundhay, aged 53.

READ.—On the 26th ult., at Windsor-road, Denmark-hill, in his 81st year, Reginald Read, M.D., F.R.C.P. Edin., late of Guilford-place, Russell-square.

N.B.—A fee of 5s. is charged for the Insertion of Notices of Births, Marriages and Deaths.

Medical Diary for the ensuing Week.

Monday, April 10.

KING'S COLLEGE HOSPITAL.—Operations, 2 P.M.; Fridays and Saturdays, at the same hour.

ST. BARTHOLOMEW'S HOSPITAL.—Operations, 1.30 P.M.; and on Tuesday, Wednesday, Friday, and Saturday at the same hour.

ST. MARK'S HOSPITAL.—Operations, 2 P.M.; Tuesday, 2.30 P.M.

ST. THOMAS'S HOSPITAL.—Ophthalmic Operations, 2.30 P.M.; Friday, 2 P.M.

ROYAL LONDON OPHTHALMIC HOSPITAL, MOORFIELDS.—Operations, daily at 10 A.M.

ROYAL WESTMINSTER OPHTHALMIC HOSPITAL.—Operations, 1.30 P.M.; and each day at the same hour.

CHELSEA HOSPITAL FOR WOMEN.—Operations, 2 P.M.; Thursday, 2 P.M.

HOSPITAL FOR WOMEN, SOHO-SQUARE.—Operations, 2 P.M.; and on Thursday at the same hour.

METROPOLITAN FREE HOSPITAL.—Operations, 2 P.M.

ROYAL ORTHOPÆDIC HOSPITAL.—Operations, 2 P.M.

CENTRAL LONDON OPHTHALMIC HOSPITAL.—Operations, 2 P.M., and each day in the week at the same hour.

UNIVERSITY COLLEGE HOSPITAL.—Ear and Throat Department, 9 A.M.; Thursday, 9 A.M. Eye Department, 2 P.M.

ODONTOLOGICAL SOCIETY OF GREAT BRITAIN (40, Leicester-sq., W.C.).—8 P.M. Casual communications by Messrs. R. H. Woodhouse, F. J. Bennett and others.

MEDICAL SOCIETY OF LONDON.—8.30 P.M. Dr. W. R. Gowers: Neurology and Therapeutics.

Tuesday, April 11.

GUY'S HOSPITAL.—Operations, 1.30 P.M., and on Friday at the same hour. Ophthalmic Operations on Monday at 1.30 and Thursday at 2 P.M.

CANCER HOSPITAL, BROMPTON.—Operations, 2 P.M.; Saturday, 2 P.M.

WESTMINSTER HOSPITAL.—Operations, 2 P.M.

WEST LONDON HOSPITAL.—Operations, 2.30 P.M.

UNIVERSITY COLLEGE HOSPITAL.—Skin Department, 1.45; Saturday, 9.15.

ST. MARY'S HOSPITAL.—Operations, 1.30 P.M. Consultations, Monday, 2.30 P.M. Skin Department, Monday and Thursday, 9.30 A.M. Throat Department, Tuesdays and Fridays, 1.30 P.M. Electro-therapeutics, same day, 2 P.M.

ROYAL MEDICAL AND CHIRURGICAL SOCIETY.—Mr. W. Bruce Clarke: Acute Renal Dislocation.—Mr. Henry T. Butlin: On the Removal of a "Pressure-pouch" of the Œsophagus.

Wednesday, April 12.

NATIONAL ORTHOPÆDIC HOSPITAL.—Operations, 10 A.M.

MIDDLESEX HOSPITAL.—Operations, 1.30 P.M.; Saturdays, 2 P.M. Obstetrical Operations, Thursdays, 2 P.M.

CHARING-CROSS HOSPITAL.—Operations, 3 P.M., and on Thursday and Friday at the same hour.

ST. THOMAS'S HOSPITAL.—Operations, 1.30 P.M.; Saturday, same hour.

LONDON HOSPITAL.—Operations, 2 P.M.; Thursday and Saturday, same hour.

ST. PETER'S HOSPITAL, COVENT-GARDEN.—Operations, 2 P.M.

SAMARITAN FREE HOSPITAL FOR WOMEN AND CHILDREN.—Operations, 2.30 P.M.

GREAT NORTHERN CENTRAL HOSPITAL.—Operations, 2 P.M.

UNIVERSITY COLLEGE HOSPITAL.—Operations, 1.30 P.M. Dental Department, 9.30 A.M. Eye Department, 2 P.M.

ROYAL FREE HOSPITAL.—Operations, 2 P.M., and on Saturday.

CHILDREN'S HOSPITAL, GREAT ORMOND-STREET.—Operations, 9.30 A.M. Surgical Visits on Wednesday and Saturday at 9.15 A.M.

HUNTERIAN SOCIETY.—8.30 P.M. Clinical Evening. Mr. J. F. Woods: (1) Case of Myxœdema treated with Thyroid Extract: (2) Cases illustrating the Treatment of Alcoholism by Hypnotism.—Dr. Arthur Davies: (1) Case of Bell's Paralysis of Twelve Years' Duration: (2) Case of Hemicranial Diaphoresis.—Dr. Hingston Fox: (1) Case of Lymphadenoma; (2) Case of Myxœdema treated by the Administration of Crude Thyroid Glands. And other cases.

Thursday, April 13.

ST. GEORGE'S HOSPITAL.—Operations, 1 P.M. Surgical Consultations, Wednesday, 1.30 P.M. Ophthalmic Operations, Friday, 1.30 P.M.

UNIVERSITY COLLEGE HOSPITAL.—Operations, 2 P.M. Ear and Throat Department, 9 A.M. Eye Department, 2 P.M.

Friday, April 14.

ROYAL SOUTH LONDON OPHTHALMIC HOSPITAL.—Operations, 2 P.M.

UNIVERSITY COLLEGE HOSPITAL.—Eye Department, 2 P.M.

CANCER HOSPITAL (Fulham-road, S.W.).—4 P.M. Mr. E. Cotterell: Tumours of the Genito-Urinary System.

CLINICAL SOCIETY OF LONDON.—Mr. H. Allingham: A case of Gastro-Enterostomy for Cancer of the Pyloric End of the stomach.—Dr. Claude Wilson: A Sequel to some cases showing Hereditary Enlargement of the Spleen.—Mr. W. H. Battle: A case of Abdominal Section for Rupture of the Spleen.—Dr. Lucas Benham: A case of Psoas Abscesses Fatal through Renal Complications.

Saturday, April 15.

UNIVERSITY COLLEGE HOSPITAL.—Operations, 2 P.M.; and Skin Department, 9.15 A.M.

METEOROLOGICAL READINGS.

(Taken daily at 8.30 a.m. by Steward's Instruments.)

THE LANCET Office, April 6th, 1893.

Date.	Barometer reduced to Sea Level and 32° F.	Direction of Wind.	Dry Bulb.	Wet Bulb.	Solar Radia in Vacuo	Maximum Temp. Shade.	Min. Temp.	Rainfall.	Remarks at 8.30 A.M.
Mar. 31	29·83	S.W.	49	45	110	69	44	..	Foggy
April 1	29·94	S.W.	49	45	110	70	44	..	Foggy
,, 2	30·20	N.E	49	45	110	63	44	..	Bright
,, 3	30·26	N.E.	45	42	102	65	41	..	Hazy
,, 4	30·25	E.	48	43	100	63	41	..	Bright
,, 5	30·19	E.	49	48	91	56	46	..	Overcast
,, 6	30·11	E.	46	45	65	51	45	..	Overcast

Notes, Short Comments & Answers to Correspondents.

EDITORIAL NOTICE.

IT is most important that communications relating to the Editorial business of THE LANCET should be addressed *exclusively* "TO THE EDITORS," and not in any case to any gentleman who may be supposed to be connected with the Editorial staff. It is urgently necessary that attention be given to this notice.

It is especially requested that early intelligence of local events having a medical interest, or which it is desirable to bring under the notice of the profession, may be sent direct to this Office.

Lectures, original articles, and reports should be written on one side only of the paper.

Letters, whether intended for insertion or for private information, must be authenticated by the names and addresses of their writers, not necessarily for publication.

We cannot prescribe or recommend practitioners.

Local papers containing reports or news paragraphs should be marked and addressed "To the Sub-Editor."

Letters relating to the publication, sale and advertising departments of THE LANCET *should be addressed "To the Publisher."*

We cannot undertake to return MSS. not used.

PUBLISHER'S NOTICE.

IN order to facilitate the work of reference to the volumes of THE LANCET, we have arranged in the future to publish duplicate copies of the Index to each half-yearly volume in a form in which they may be subsequently filed or bound together.

We have had a large number of duplicate copies of the Index to the last half-yearly volume printed, and those of our subscribers who may wish to be supplied with loose copies can obtain the same (without extra charge) on making application to the Publisher of THE LANCET.

DOUBTFUL DIAGNOSIS AND THE INTERVENTION OF THE MEDICAL OFFICER OF HEALTH.

Mr. Henry Brand—It is not the duty of the medical officer of health to sit in judgment on the accuracy of the diagnosis of the medical attendant who has notified an infectious disease. If he had any good reason for doubt in the matter his duty would be to communicate directly and in a friendly way with the notifying practitioner, on whom the law has placed the responsibility of decision.

A CASE OF INTUSSUSCEPTION.

To the Editors of THE LANCET.

SIRS,—I think it may be worth while to place this case on record, as it appears to be an example of a condition referred to in THE LANCET of Oct. 15th, 1892, as unusual.

The patient was a male child of Mohammedan parentage aged nine months, who was brought to me on Nov. 10th, 1892. The illness was said to have begun about noon on the day before—i.e., about twenty-four hours previously, the symptoms observed by the mother being a discharge of blood from the anus and a lump in the abdomen. The child had been sick, but how frequently could not be accurately ascer-

tained, and no fæcal matter had been passed. He appeared also to have abdominal pain at times. The infant was a healthy looking child, and did not appear at all collapsed. The face was a little flushed, but the temperature was normal. In the left side of the abdomen a tumour could be felt, most distinct in the iliac region. One end of it could be just touched by the finger inserted into the rectum, but the other end was not distinctly made out. The abdomen was not rigid or distended, and there did not appear to be very marked tenderness. I gave chloroform and slowly injected a quantity of warm water into the bowel with a Higginson's syringe, the child being at the same time held in a half inverted position, as the sphincter ani was so lax that it was difficult to prevent the water escaping almost as fast as it was injected. By repeated injections the intussusception was gradually reduced, the receding tumour being traced in the intervals between them along the descending and transverse portions of the colon. Finally, only a small lump, apparently about the size of a small walnut, could be felt in the cæcal region; but one or two further injections, distending the whole colon, failed to make it disappear. This I supposed to be a small portion of the intussusception which had remained unreduced, and I therefore recommended laparotomy; but, in spite of endeavours to make them understand the gravity of the case, the consent of the parents could not be obtained. They went off to consult with other relatives, taking the child with them, and I heard nothing more of the case until about a fortnight ago, when I was told that he had recovered, having no further bad symptoms from the time of the injections. On Feb. 11th I myself saw him alive and well.

I think there can be no doubt that the condition in this case was identical with that described by Mr. Bilton Pollard in THE LANCET of Oct. 15th, 1892, although the confirmatory evidence afforded by laparotomy is not forthcoming. The supposition that the small swelling still felt after reduction by injection of water was due to the swollen condition of the ileo-cæcal valve affords a satisfactory explanation of its persistence when the reduction must have been really complete.

I am, Sirs, yours truly,

E. M. FARRER, M.B., B.S. LOND.

Bhiwani, Punjab, India, Feb. 18th, 1893.

THE SALE OF MIDWIVES' "DIPLOMAS" BY THE OBSTETRICAL SOCIETY AND THE LIVERPOOL LYING-IN HOSPITAL.

DR. RENTOUL sends us a communication too long for insertion, deprecating the sale to women of "diplomas," as he calls them, in midwifery, observing that the General Medical Council has "made a rule" to the effect that these diplomas have no legal value. The sale of these diplomas has realised in the case of the Obstetrical Society in the course of eighteen years £988 5s., and in the case of the Liverpool Lying-in Hospital £1000 in eight years. What the General Medical Council did was, we believe, not to "make a rule," but to inform Dr. Rentoul that such certificates are neither licences nor diplomas and possess no legal value, and to point out through the President to the "institutions and persons" who grant such certificates that the certificates should be expressed in such a form as not to lead to the impression that they are legal qualifications to practise midwifery. It is undoubtedly unsatisfactory that the granting of such certificates should be a sort of business and a source of profit to either societies or individuals who like to take up the work. If the Act of 1886, which required full qualification in medicine, surgery and midwifery, is to be tampered with, it should be on conditions and by authorities defined by Parliament.

Inquirer has not enclosed his name and address.

SANITARY PRECAUTIONS.

To the Editors of THE LANCET.

SIRS,—On page 753 of THE LANCET of last week you note the compulsory bath system at Kirkby Stephen. I do not wish to draw inordinate praise upon any of my sanitary authorities, much less on the virtual originator of their action, but I may add that at Kirkby Stephen other means are adopted which you may think worthy of imitation in other districts—viz., all the sleeping rooms occupied by tramps are disinfected during the daytime with chlorine and all the clothing of the tramps is taken from them when they go to sleep, and during the night is also exposed to the chlorine fumes for several hours. Whilst revaccination will protect a person who may have been exposed to infection, it seems to me absolutely necessary that the further means of daily disinfection of every item of clothing &c. ought to be carried out for the protection of those who have not been and are not willing to be revaccinated. Another measure adopted is weekly public vaccination in lieu of the usual three weeks in every third month. This is only in the country places, of course, weekly vaccination in the borough of Kendal being the regular practice at all times of the year.

I am, Sirs, yours truly,

Kendal, April 1st, 1893. R. MUSGRAVE CRAVEN, M.O.H.

CLUB PATIENTS AND RAILWAY ACCIDENTS.

Surgeon.—The question is a legal one; but we should have no hesitation in saying that it is unreasonable to expect the surgeon of a club to attend a club patient for injuries caused by a van belonging to a company, which company has admitted its liability.

THE LIMITATION OF PENALTIES FOR NON-COMPLIANCE WITH THE VACCINATION ACTS.

BRIGADE-SURGEON ROBERT PRINGLE, M.D., favours us with a communication on the above subject. We are unable from want of space to insert the whole letter, but quote a few sentences, which contain the gist of his contention.

"If Mr. Asquith," says Dr. Pringle, "and those who agree with him on the subject of the limitation of penalties for non-compliance with the Vaccination Acts succeed in carrying their point, the outcome will be the formation throughout the country of insurance societies for the payment of the single penalty for non-compliance by a small weekly payment, for a longer or shorter period, according to its amount. The result of this will of necessity be the practical voluntary acceptance of vaccination, as the rich will aid in paying the penalty for the very poor, who may be unable to meet even a small weekly payment. Here lies the whole secret of this urging of the limitation clause; and it therefore seems to me that this will have the effect, not only of practically making this acceptance voluntary, but doing it in a manner which forfeits the only justifiable plea for the infliction of any penalty for non-compliance and doing it by means of what is really a legal evasion obtainable by a fixed payment. If compulsory vaccination is necessary for the public health there should be no means of evading it, and certainly no legal ones. If vaccination can be shown to be either not necessary or only so at a cost of risk of injury to health out of proportion to the supposed benefit, then let compulsion be abandoned and the acceptance of the prophylactic made voluntary, and the country take the consequences."

Mr. Edgar Waelly should consult the Medical Directory.

HYPERPYREXIA IN A CASE OF INFLUENZA.

To the Editors of THE LANCET.

SIRS,—The following case strikes me as being of some interest on account of such an astonishingly high temperature:—

A plasterer was taken ill with pains in his limbs, back and head on Monday, March 13th. I saw him the same day, and found him suffering from influenza, his temperature being at that time 103° F. It never rose above this (and dropped on two or three occasions to 101° F.) until the Monday following (March 20th). I was called to him at 3 A.M., when I found him quite insensible, with very pronounced stertorous breathing, and on taking his temperature I was extremely astonished to find it registered 108·8° F. On touching his skin it was so hot that I could barely keep the back of my hand on it. I immediately ordered him to be sponged all over with cold water, but he succumbed in less than half an hour. His wife informed me he had spoken quite sensibly to her at 2 A.M. and had taken some milk. I had carefully examined him throughout his illness for any lung, cardiac or cerebral trouble, but could discover nothing amiss. It might be suggested that my thermometer was wrong. I can only say I had quite recently tested it with several others and have done so since, but find it to be correct.

I am, Sirs, yours faithfully,

W. H. BOGER, M.R.C.S. Eng., L.R.C.P. Edin.

Fowey, Cornwall, March 26th, 1893.

METEOROLOGY.

THE Weather Conference which is to take place at Chicago in the autumn may or may not result in the formulation of data by which forthcoming weather may be safely predicted. A little pamphlet, written by Mr. Hugh Clements, sets forth a plan by which this desirable end may be attained. In view of the very moderate amount of success achieved up to the present time by experts on meteorology, it is excusable not to indulge in extravagant hopes in the practical outcome of the Conference or in the efficacy of the scheme propounded by the writer referred to.

COMMUNICATIONS not noticed in our present issue will receive attention in our next.

During the week marked copies of the following newspapers have been received:—*Leicester Daily Mercury, Western Daily News, Blackburn Daily Telegraph, Pontefract Express, Lancashire Evening Express, Cork Constitution, Oban Telegraph, Cheshire Evening Echo, Morpeth Herald, Louth and North Lincolnshire Advertiser, Liverpool Courier, North Eastern Daily Gazette, Poole Herald, Yorkshire Post, Jersey Observer, Coatbridge Express, Birmingham Gazette, Kentish Mercury, Bristol Times, Liverpool Daily Post, Bristol Mercury, Glasgow Herald, Stafford Evening Post, Dundee Courier, Wolverhampton Chronicle, Leeds Mercury, Reading Mercury, Mining Journal, The Morning, Weekly Free Press and Aberdeen Herald, Public Health, West Middlesex Standard, Surrey Advertiser, Local Government Chronicle, Hertfordshire Mercury, Metropolitan Journal, Scottish Leader, Cape Argus, Sunday Times, Builder, Architect, Observer, Sunday Chronicle (Manchester), Waterford Chronicle, Citizen, West Middlesex Advertiser, Leith Burghs Pilot, Scotsman, Indian Daily News, Pioneer Mail, Fraserburgh Advertiser, Times of India.*

Communications, Letters &c. have been received from—

A.—Dr. W. S. Alexander, Dublin; Dr. P. H. Abercrombie, Vienna; Dr. F. P. Atkinson, Surbiton; Mr. T. Algar, Vienna; Messrs. Armour and Co., London; Messrs. Allen and Hanburys, London; A. F. T., Bournemouth; Argyle Rubber Co., Glasgow.

B.—Dr. I. Bourke, London; Dr. C. Bage, Melbourne; Dr. F. Lucas Benham, London; Dr. Boxall, London; Mr. A. Baker, London; Mr. Heather Bigg, London; Mr. C. Birchall, Liverpool; Dr. S. Jex Blake, Edinburgh; Mr. C. Ball, St. Leonards; Mr. F. Jeffry Bell, London; Mr. W. H. Bennett, London; Messrs. Burgoyne and Co., London; Messrs. Bruce and Co., London; *Birmingham Daily Post*, Editor of; Bromsgrove Cottage Hospital.

C.—Dr. G. Campbell, Forfarshire; Mr. T. J. Croke, Beverley; Mr. G. Carter, Ilkley; Messrs. Cassell and Co., London; Messrs J. and A. Churchill, London; Messrs. J. A. Carveth and Co., Toronto.

D.—Mr. F. W. Dingle, Bath; D.Sc., London; Doctor, Hammersmith.

E.—Brigade-Surg.-Lt.-Col. George Evatt, Woolwich; Early Closing Association, London.

F.—Sir Joseph Fayrer, Calcutta; Mr. W. Hay Forbes, Tunbridge Wells.

G.—Dr. R. Gennaro-Torre, Annunziata; Mr. W. J. Gant, Hastings; Mr. G. De G. Griffith, London; Mr. A. G. P. Gipps, China; Messrs. Griffin and Co., London.

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J.—Johannis Co., London.

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L.—Dr. Robert Lee, London; Dr. J. F. Little, London; Dr. Thos. Glover Lyon, London; Mr. John Lane, Kingswood-park; Mr. H. Law, Lancashire; Mr. Horace Lowther, Isle of Wight.

M.—Dr. J. McD. Mackay, Fortrose; Dr. A. Campbell Munro, Paisley; Dr. James Murphy, Durham; Dr. John Meredith, Somerset; Mr. G. Michelmore, Tiverton; Mr. R. Mosse, London; Mr. James Meeham, London; Mrs. Monkhouse, Tulse-hill; Messrs. Macniven and Cameron, Edinburgh; M.D., M.R.C.P., L.R.C.S.; M.D., Walworth; M.B., C.M. Ed.; Manchester Royal Infirmary.

O.—Dr. H. O'Neill, Belfast; Dr. Henry Alston, Trinidad; Mr. W. Odell, Torquay; Mr. G. W. O'Flaherty, Downpatrick; Opportunity, London.

P.—Dr. H. Penna, Rio de Janeiro; Brigade-Surgeon Robert Pringle, Blackheath; Mr. Awdry Peck, London.

Q.—Queen Margaret College, Glasgow.

R.—Dr. C. H. Ralfe, London; Dr. A. Maitland Ramsay, Glasgow; Prof. Rubino, Napoli; Mr. G. R. Rudd, Exeter; Mr. L. Rawsthorn, Preston; Mr. George Redford, Cricklewood, London, N.W.; Messrs. Rowntree and Co., York; Messrs. Robertson and Scott, Edinburgh; Rotherham Hospital; R. J. F., London; Royal College of Surgeons.

S.—Dr. Fred. J. Smith, London; Dr. Herbert Snow, London; Dr. E. M. Skerritt, Bristol; Surg.-Capt. T. Shaw, Goona; Mr. J. Bland Sutton, London; Mr. H. Sells, London; Mr. J. Swale, Leeds; Mr. T. Seni, Kustendji; Messrs. Street and Co., London; Surgeon, London; St. Mungo's College, Glasgow; St. Luke's Hospital.

T.—Dr. Thresh, Chelmsford; Mr. W. B. Tate, Nottingham; Miss Taylor, Westminster; Tuson's Disinfectants Co., New Charlton.

V.—V. C., London.

W.—Dr. S. White, Sheffield; Mr. W. N. Willoughby, West Norwood; Mr. F. Woods, Dorset; Messrs. Wright, Dain and Co., Birmingham; Messrs. Whitworth and Stuart, Manchester; Messrs. White, Druce & Brown, London.

Y.—*Yorkshire Post*, Leeds.

Letters, each with enclosure, are also acknowledged from—

A.—Dr. W. Adam, Rainhill; Dr. J. Althaus, London; Alpha, Birmingham; Alpha, London; A. B., London; 107, Arundel-avenue, Liverpool.

B.—Mr. Bell, Lancaster; Mr. T. B. Brooke, London; Mr. Beatt, Cavan; B. B., London.

C.—Mr. W. P. Cox, Leicester; Mr. J. Crawford, Tredegar; *Cornishman*, Editor of, Penzance.

D.—Mr. H. N. Davies, Llanrwst; Dr. W. Dale, Bishop's Teignton; Dr. A. M. De Souza, Bombay; Mrs. Danby, Lincoln; Determination, London; Delta, London; D.Sc., London.

E.—Miss Elliott, Newton Heath; Excellent, London; Edinburgh School of Medicine; E. F., Southsea; E. R. N., London; Esenine, London; E. L. M., Birkenhead.

F.—Mr. R. Fitzgerald, Middleton, Cork; Fylde, London; Fellowships, Edinburgh; Felix, London.

G.—Dr. T. H. Gibson, Tubay; Mr. W. Gillyard, Bradford; G. H. B., London; Golf, London.

H.—Dr. R. Hollings, Wakefield; Mr. R. Harris, West Bromwich; Messrs. Hooper and Co., London; Messrs. Herington & Co., London.

I.—Dr. Mahomed Ismail, Hyderabad; Ilex, London.

J.—Mr. F. F. Jones, Llanfyllin; Messrs. James and Smith, Liverpool; Juvenis, London; Justitia, London.

K.—Mr. C. Keys, West Bromwich.

L.—Lucius, London.

M.—Dr. J. Montgomery, Birmingham; Messrs. Mertens and Co., London; Major, Manchester; Mayfly, Middlesbrough; Mater, Denmark-hill; M.D., Liverpool; Medicus, London.

N.—Mr. W. R. Nicholson, York; Newcastle Corporation; Nucleus, London.

O.—Opportunity, London.

P.—Pritchard-Aisey, Talwrn; P.O., London.

R.—Mr. R. Redpath, Newcastle-on-Tyne; Mr. W. M. Riley, Hereford; Miss Robertson, Hawkhurst; Messrs. Read and Co., Bristol; Rusticus, London.

S.—Dr. Snadden, Sheffield; Mr. F. W. Stoddart, Bristol; Messrs. Steel and Jones, Bristol; Scalpel, London.

T.—Mr. J. Tibbit, Dunstable; Mr. Tyte, Minchinhampton; Mr. J. Thin, Edinburgh; T.W., London.

U.—Mr. F. W. Underhill, Moseley.

V.—Dr. W. B. Vanderpoll, New York.

W.—Mr. J. E. Williams, Cheadle; Mr. J. C. Warren, New Brompton; Miss Worboys, London; Messrs. Wood and Co., New York; Wonford House Hospital, Exeter; Western General Dispensary, London; Westfield, London; W. R. A., Oxford.

X.—X. Y. Z., London.

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Agent for the Advertisement Department in France—J. ASTIER, 66, Rue Caumartin, Paris.

REPORT OF

THE LANCET

SPECIAL SANITARY COMMISSION OF INQUIRY

CONCERNING THE

WATER-SUPPLY OF CHICAGO, U.S.A.

THE city of Chicago has, speaking roughly, two outlets for its sewage matters—Lake Michigan and the Mississippi River—and one source of water-supply—Lake Michigan. The Chicago River, which serves as main sewer to the city, flows naturally into the lake, but in order that its burden of sewage matters may not be all discharged there a powerful pumping station has been erected some distance up the stream on its southern branch. From this point the river water is pumped over a lock into a canal which carries it far south into the Missouri and eventually into the Mississippi River. The bulk of the liquid sewage is disposed of in this way. Several sewers serving the Lake shore districts of the city debouch upon the lake, but their aggregate output is estimated at less than 15 per cent. of the total sewage of the city. Subject to this abatement the Missouri and Michigan Canal receives as its quota of the whole discharge the liquid, dissolved and floating matters. The suspended matter which deposits as sludge on the river bottom is removed by dredging and carried out to the lake; which thus receives these solid matters in addition to the Lake shore sewers' discharge as its proportion of the city's drainage.

The water supplied for domestic and other use within the city is, as already stated, drawn from the Lake, and is conveyed to the pumping stations, which are distributed at various points throughout the city, by subterranean aqueducts extending for distances which vary from one to four miles, under the bottom of the lake. The water is thus taken from points lying at various but no great distances from the sources of pollution, and chosen with regard to the observed effect which the sewers produce upon the condition of the Lake water. The water so obtained is pumped into the city mains and undergoes no filtration or other treatment until it is delivered in the consumer's house, save such as may result from the mixing of atmospheric air with it in the pumping operation, and the deposition of some greater or lesser proportion of its suspended matters in the conduits through which it flows.

In addition to the water of the Lake, waters from three other sources of supply have been examined in the course of this inquiry. These are (1) the water of the Washington Heights artesian well, a source of supply for a limited district within the city which need not be considered in this place, and (2) and (3) the waters from the "Hygeia" and "Silurian" wells at Waukesha—spring waters which are largely consumed for drinking purposes within the city and of which the first named, "Hygeia" water, is by means of a special pipe to be brought in large quantities and distributed at a charge of one cent (one halfpenny) a glass throughout the World's Fair grounds. For the preparation of lake water for drinking the use of domestic filters is very common in Chicago, and may be said to be universal in the hotels, the form of filter most in favour being that known by the name of Pasteur—in design a very excellent instrument and one which, so long as it remains undamaged by fracture or displacement of its parts, may be relied upon to do its work efficiently.

Such in bare outline are the conditions under which water is supplied to Chicago. Those of our readers who may be interested to examine these facts more carefully will find them detailed in the technical portions of the report of this Commission. We now proceed to deal here with the results to which the chemical examination has led. It will of course be understood that the chemical examination of water deals only with the question of pollution, not with that of infection. A water that is chemically of very high character in respect of purity may by chance be seriously infected with disease germs, and, on the other hand, a water which is extremely foul may be absolutely free from the seeds of specific disease. This question can only be positively answered by bacteriological examination and by the study of the effects of the water on those who drink it. No such bacteriological examination has been practicable in the present case, because of the length of time necessarily consumed in transporting the specimens from Chicago to London. The period so occupied would have sufficed for the occurrence of most important changes in the conditions of bacterial life upon which such an examination must proceed. The value of chemical analysis is chiefly due to its affording a very substantial ground of inference. Typhoid fever, cholera and diarrhœa are the principal disorders which are disseminated by sewage-contaminated water, and in practice water receives such germs from sewage only. If, therefore, sewage contamination can be detected by any means, it is certain that the contaminated water is unsafe for drinking purposes, however innocent the actual sewage matter discovered may itself be, for the vehicle which conveys innocuous sewage to-day may convey pernicious germs to-morrow. A water which is chemically impure, if the impurity be traceable to sewage contamination, must be an object of distrust; so also must a water which is excrementally polluted, even if chemical analysis fails to show evidence of this pollution. It is to the determination of the sewage-derived constituents that the labours of Mr. Crookes and of our own analyst have been chiefly directed and their detailed technical report has settled the rank in the order of purity of every one of the specimens of water subjected by them to analysis. For the citizens of Chicago and for anybody else who is interested in the elaboration of the large schemes of sewerage and water-supply which must sooner or later be undertaken by the great and growing city, their report will possess a permanent interest, and will be of greatest interest precisely in those passages which are chiefly of theoretical significance—in those, for example, which deal with the condition of the Chicago River and the Lake dumping grounds. These, from our present point of view, may be summed in a very few words. The river is shown to have distinct characters in four different parts of its course. In the North branch it is satisfactorily pure and perfectly sweet water. In the Southern branch it shows increasing pollution as one travels back from the mouth towards the source, and in the branch which turns away towards the stockyards and lies apart from the main current of the river filth has accumulated to an extent which has converted the water into a material more offensive than the untreated outpourings of an ordinary sewer. Bad as the river is at this point, it is, however, unnecessary to warn visitors against frequenting its neighbourhood, for the simple reason that the stench of it is warning enough and no ordinary traveller through those parts is at all likely to approach the river unwittingly or to seek its precincts as a matter of choice. It is not at all surprising to find that typhoid

fever and diarrhœa, when they are prevalent at Chicago, prevail chiefly in those parts of the city which abut upon this noxious branch of the Chicago River.

The Lake at the time when our samples were drawn was free from chemical evidence of sewage pollution to an extent that, regard being had to the amount of sewage which in one form or another it receives, is surprising. In connexion with this result it must be borne in mind that the season was peculiarly favourable to the purity of the Lake water. For some weeks before Dec. 10th the weather had been tempestuous, and it was only by seizing a favourable opportunity that the tug employed by our agent was able to get out upon the Lake. It may be taken for granted, therefore, that dredging operations had been suspended for some time, at least so far as dumping the sludge in the Lake is concerned. Still, when all due allowance is made for this circumstance, it is, as we have said, a surprising fact that water taken from the Lake over the dumping grounds was of a quality, save for its suspended matter, superior to that of the ordinary London water-supply—that is to say, the percentage of dissolved matter of organic origin was less than in the London waters, and as the suspended matter could all be removed by effective filtration it is plain that even at this point the Lake, under favourable conditions, will supply water which wants nothing but the most ordinary treatment to render it fit for any and every domestic purpose. It is a result of our labours upon which we congratulate the people of Chicago most cordially and with the liveliest satisfaction that they have thus demonstrated the possession by the city of an illimitable water-supply, which needs nothing but good management to render it all that could be desired.

In one way this great boon has proved a bane to the people of Chicago; for, having so superb a supply of water ready to hand, they have—naturally enough, perhaps—used it as they found it, and consequently their very extensive water-works are designed with the view simply of pumping, and in no way of treating by filtration, the water of the Lake. Unfiltered, this water is quite unfit for drinking by reason, as we have pointed out, of its suspended matter, hence the security of Chicago against a serious outbreak of epidemic disease depends entirely on the care with which the water is purified before use by means of domestic filters. This is the weak spot in the city's armour, and to this we desire in the most effective manner possible to draw the serious attention both of the citizens and of the urban authorities. The matter is one of capital importance to visitors to the city; it is of equal importance and of even more permanent concern to those who dwell there. Now, it will be found on reference to the chemical report that our specimens have included two samples of filtered Lake-water. These samples should have been beyond reproach. Both had been treated by the Pasteur filter, and yet both were found to contain suspended matter in great abundance, so that neither could be trusted to be free from dangerous impurities. The explanation of this seeming anomaly is perfectly simple. *The filtered water had in both cases been cooled by the admixture of polluted ice.* No words are necessary to prove that this is a foolish and most mischievous practice. It manifestly renders the filtration wholly futile. Yet we are informed that it is common, even to the point of being almost universal, throughout the United States; but with any widespread custom we are not now concerned. Our attention is claimed by the city of Chicago, and here during the present year the practice will involve the most formidable risk. The presence of a vast concourse of people drawn from every quarter of the globe is obviously a condition of things which calls for the adoption of special sanitary measures, and nothing whatever could be more plainly or more imperiously demanded by the circumstances of the case than safe methods of treating the drinking water. The general use of filters in the hotels and restaurants of Chicago is, therefore, a necessary safeguard; but it is no safeguard at all if contaminated ice be permitted to dissolve in the filtered water.

It may seem, perhaps, that we are bestowing excessive labour upon an obvious point in thus insisting upon and reiterating a proposition which nobody will be found to deny; but it is a practical and not a merely logical aim that we have in view in writing thus. Our inquiry has brought to light a practice fraught with peril at any time, and capable at the present moment of breeding mischief on an appalling scale. If this custom is to be uprooted and a better system introduced something more must be done than to demonstrate, however clearly, that the system complained of is incorrigibly bad; or to point out, however instructively, the simple and obvious remedy of using two receptacles placed one within the other for the cooling ice and the drinking water respectively, so that they may not mix their contents or pass anything but heat from the one to the other. So much is easy enough; the difficult task is to make people understand and feel of how weighty significance such clear and simple statements are. For ourselves, we are so impressed with the importance of this point that we shall esteem the trouble and expense which we have undertaken in the prosecution of this inquiry to have been excellently well bestowed if, as the result of all, we can convey to our American hosts an adequate sense of the issues both to them and to us which are involved in the careful avoidance of this one channel of infection. The researches, of which we to-day publish the results, have brought to light a great number of points of first-class interest and importance to which, in this summary review, we have so far made no allusion; but imperfect as this survey is, we prefer to leave it so, rather than to weaken, by passing to another topic, the effect of these observations upon the dangers of the contamination of drinking water by means of cooling ice. In other respects our examination of the facts has led to what is, upon the whole, a reassuring result; but we cannot feel free from very serious misgiving until we are reassured upon this point also; for the statistics of mortality show that Chicago suffered from typhoid fever nearly eight times as much as London in 1890 and nearly twelve times as much as London in 1891. To our own people we commend in the strongest terms the advice to *drink no water which has been cooled in contact with ice;* to the people of Chicago we appeal to provide a supply of water free from this reproach.

COURSE OF THE INQUIRY.

In an article devoted to the subject of the inquiry of which the results are collected in the following pages we have explained the circumstances which led us to undertake the task. The results are fully set forth in the technical chapter which follows this, and which contains the reports drawn up by the chemists who have conducted the analyses of the lake, river, and domestic supply waters. It will be interesting and indeed not unimportant to recount here, by way of introduction to that report, the steps by which the work has proceeded, in order that the true significance and value of the result itself may be ascertainable by those of our readers who may be interested to examine it in detail.

The first step taken, when the task had been resolved upon, was to obtain the fullest available information concerning the systems of drainage and water-supply. The principal sources from which this information was collected were the Mayor's messages for the years 1890 and 1891. In these documents a very large amount of information was to be found, which we were able to supplement in a few particulars from less authoritative sources; and here it is only just to observe that, although unofficial sources of information are singularly meagre, we have found the city authorities exceedingly courteous in dealing with our inquiries and on all occasions most ready to give the information asked for. Except that most of it has come to hand in a somewhat fragmentary and disconnected form, we have therefore experienced no trouble beyond that of asking questions in a distant place in the acquisition of such materials as were necessary for our purpose.

The raw material so obtained was placed in the hands of a member of our staff and from it he compiled a connected account of the general schemes of drainage and water-supply, which was furnished to the chemists by way of explanation of the specimens of the water, which had been in the meantime analysed by them, and in this way it became a part of the materials upon which their report was based. At the same time a proof of this statement was forwarded to the Mayor of Chicago with an explanation of the objects aimed at in the inquiry and of the steps taken to secure its efficiency. He was asked to give the paper his attention and to favour us with his criticism upon it should he find it to be in any respect inaccurate and to bring to our knowledge any matters omitted therefrom which might appear to him necessary or proper to be considered in this connexion. The Mayor replied that he would cause an exact report of the drainage system and the water-supply of the city to be prepared and furnished to us, a promise which was duly redeemed a fortnight later. The official statement so furnished by the Mayor of Chicago has been given in this report as received from him in the form of letters from the several city authorities (city engineer and medical officer of health),

and our own statement, revised and completed in the light of this communication, appears in the present context as Appendix I.

Whilst the work of collecting information was thus going on in one department, that of collecting samples of water for analysis was going on in another. For this duty the services of Mr. Frederic Mayer, a journalist residing in Chicago, had been secured in the manner to which allusion has already been made in the earlier narrative. In order that there might be no mistake about the provision of suitable bottles and packing cases, these were attended to in London, and early in November last two packing cases, prepared and fitted by Messrs. Baird and Tatlock, were despatched to our agent in Chicago containing each a dozen bottles, all of which had been carefully washed, sterilised and stoppered and capped with parchment before being sent. The parchment caps were secured with THE LANCET seal, and so business-like did these empty bottles appear that the Custom House examiner at Chicago sent for the consignee and demanded of him what kind of gas he was importing into the United States. It seems that the McKinley tariff had not imposed a duty upon London atmosphere even when bottled, and so the bottles passed in with contents duty free. The bottles were accompanied by a piece of apparatus to be used in sinking and filling them and also by minute directions for their manipulation in this operation. These are fully explained in Appendix III. to the present report.

So equipped, our agent set out upon the expedition. For this purpose he hired a steam-tug and spent a day in what we do not doubt he quite accurately describes as very arduous work on the lake and the river. Stormy weather and other adverse circumstances prevented him from carrying out this operation until Dec. 10th last. How it was then carried out may best be seen in his own report and in the log of the expedition, both of which appear in Appendix III. On Dec. 14th the two packing cases left Chicago on their return journey, and on Dec. 21st they left New York for Liverpool on board the steamship *Germanic*. Even then the troubles of the journey were only beginning, for, by a most extraordinary blunder, one of the cases, instead of being delivered at Liverpool and forwarded in due course to London, was sent back on board the *Germanic* to New York, and only arrived a month later when the *Germanic* returned from this second voyage. It had then been exposed to the cold wave which visited New York about the middle of January, and probably from this cause eight out of ten sample bottles which it contained had suffered fracture. The companion case, which came through in due course, reached us in perfect order, with all its samples intact and with unbroken seals, showing that they had reached THE LANCET Offices in precisely the same condition as that in which they left the hands of our agent at Chicago.

As soon as it was known that the samples of water had been obtained and were on their way from New York, arrangements for the chemical analysis were put in hand. We desired to obtain for this task the services of chemists whose skill and reputation would secure for their work unhesitating acceptance on both sides of the Atlantic, and therefore in the first instance we proposed to appoint a commission of three chemists and invited the American Minister in Great Britain to nominate one, the Royal Commission for the British Department of the Chicago Exhibition to nominate a second, reserving for our own analyst the third place. It was understood that if the American Minister consented to make such a nomination the Royal Commission would do likewise, but the former explained that it was a matter in which he did not feel himself authorised to act as desired, and intimated that the Mayor of Chicago would be the proper person to receive any such invitation. As it was manifestly impossible to hold the necessary communications with the Mayor of Chicago in the time at our disposal this proposal broke down completely and nothing whatever resulted from it.

It thus became necessary for us to fall back upon our own resources, and we at once applied to Mr. Wm. Crookes, F.R.S., and requested him to undertake, in consultation with our own analyst, the work of analysing and reporting upon the samples of water obtained. This he very kindly consented to do, and the whole of this work has been carried out with his advice and assistance. THE LANCET Laboratory was specially fitted up for the duty and the arrangements were inspected and approved by Mr. Crookes. In like manner the Laboratory was visited by him from time to time whilst the work was in progress and he was provided with a duplicate of every sample which was there analysed. The routine was to divide the contents of every bottle as it was opened into two portions—one was taken away by Mr. Crookes for independent control analysis, and the other was operated upon in our own Laboratory. It is not uninteresting as an example of the precision of modern chemical methods to remark that in the determination of chlorine, which was selected by Mr. Crookes as the standard test experiment, the series of figures given in Table I., and independently obtained, first in THE LANCET Laboratory and afterwards in Mr. Crookes' laboratory, were found to be in agreement to the second place of decimals. Now, as these results are expressed in grains per gallon, the effect of that statement is that the two analyses yielded results which agreed to *one part in seven millions*. It is as if two surveyors measuring a distance of 100 miles were to obtain the same result to a single inch, and were to repeat the operation fourteen different times in as many different places, always with the same startling coincidence of results.

The packing-case which suffered so severely on the journey from New York contained all the specimens of drinking-water at first obtained. These were all lost. Telegraphic instructions were immediately despatched to our agent to replace them; and this he proceeded to do, providing on this occasion his own bottles, as time did not serve for sending out a fresh supply from this country. Such a precaution was indeed unnecessary, as he was already experienced in the work of bottling the samples and the taking of drinking-water of course presented no difficulty. In one respect only did the treatment of these later samples differ from that of the earlier; that is to say, the bottles were stoppered with cork instead of glass. There seems, however, no reason to doubt that the corks were perfectly sound and effective stoppers, and, indeed, if any contamination had been occasioned in this way it would certainly have been made evident by a comparison of the domestic supply waters with the lake water samples (9, 9a and 10 of the first series). The comparison is, in fact, entirely satisfactory, and the analysis of the domestic supply waters is as worthy of trust as that of the first series of samples. The samples of the second series are numbered from 25 to 36 on the accompanying report and are not indicated on the map as they have no topographical relations properly so-called.

CHEMICAL REPORT.

The collection of samples was, as has been already explained, entrusted to a specially-appointed agent in Chicago, who was supplied from London with all necessary apparatus and instructions. The bottles selected for this purpose were of green transparent glass of 80 ounce capacity (the Winchester quart) and well stoppered. They were thoroughly cleansed and air-dried, and the stoppers tied on with parchment and sealed with THE LANCET seal before being packed in the case. Every precaution was taken to ensure the contents of the case against damage. To this end each bottle was made to fit in a box lined with baize and padded with cotton wool. The lid was also fitted with padding in which the stopper-neck and shoulder of the bottle were firmly embedded. The boxes were perfectly square, and twelve of them fitted exactly into an inner case. The inner case was closed with a lid by means of screws. The outer case into which it was placed was provided, as was also the lid, with rubber buffers to prevent shaking. The outer case was firmly screwed down and the corners protected with metal caps. Two cases so furnished were despatched direct from THE LANCET Laboratory to our agent at Chicago, who was instructed to carry out the following directions respecting the collection of the samples:—

It is desired that samples may be collected at the various spots herein indicated. The letters (longitudinal lines) and figures (latitudinal lines) refer to the large scale map of Chicago in our keeping, a copy of which you also have.

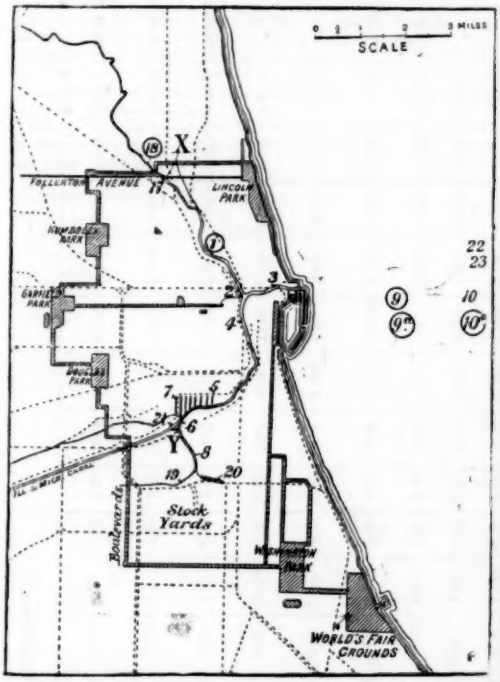
[Here followed a specification of selected spots, which need not be repeated as the localities chosen were practically identical with those shown on Map I. and enumerated in the log of the expedition.]

The temperature of the water and that of the air should be determined at each sampling station, and observations like the direction of wind, character of odour, rate of current, turbidity, nature of surroundings, recent disturbances by shipping &c., should be accurately noted, together with other information which appears to be of importance for the purposes of the present investigation.

It may be mentioned that one of the cases was further provided with a compartment in which was contained the apparatus necessary for the convenient collection of the river and lake samples. This apparatus is described and figured in Appendix III., p. 847.

The thermometers used for this purpose were afterwards examined in THE LANCET Laboratory and their readings compared with a standard thermometer. They were found to be correct to within half a degree.

MAP I., SHOWING COLLECTION OF SAMPLES.



EXPLANATION.—The numbers enclosed in circles represent samples lost in transit.

1. Chicago River at Putnam and Roberts' Bridge. (This sample was lost in transit.)
2. Ditto at junction of north and south branches.
3. Ditto between Wabash- and Rush-streets.
4. Ditto at Union Depôt.
5. Ditto at Dupont's Slip.
6. Ditto at Fuller- and Rost-streets.
7. A. Canal.
8. Chicago River abreast of Joliet steel works.
9. Lake Michigan two miles out } (These samples were lost in
9a. " " } transit.)
10. " near four mile intake.
10a. " " " } (This sample was lost in transit.)

11, 12, 13 and 14. These were all samples of drinking water taken in different parts of the city; not shown on map. (They were all lost in transit.)

15 and 16. These numbers were not used to designate samples at all.

17. Chicago River just below Fullerton-avenue.
18. Ditto half a mile above Fullerton-avenue.
19. Chicago River two miles above Canal pumping works.
20. Ditto East Fork, close to stockyards.
21. Canal near pumping station.
22. Lake Michigan. Taken over dumping ground. Deep sample (12 feet).
23. Lake Michigan. Taken over dumping ground. Surface sample.

X. Fullerton-avenue pumping station, for flushing north branch of river. (Marked *x* on Map II.)

Y. Canal pumping station, for reversing current in river. (Marked *y* on Map II.)

It will be noted on inspection of the table below (Table I.) that the temperatures all through were low, indeed in some instances the water was but a shade above freezing-point. Further than this, it so happened that cold weather prevailed throughout the journey of the bottles from the time of collection at Chicago to the day the samples were received at THE LANCET laboratory. It is safe to assume, therefore, that little or no change in the composition of the water could have taken place.

OPERATIONS IN THE LABORATORY.

The complete analysis of one sample was in each instance carried out before analytical operations were commenced with a second, so that the results might not be affected by changes which, on the withdrawal of the stopper, might take place through exposure to air. In samples containing sulphuretted hydrogen the gas was estimated immediately on opening, a precaution the necessity of which was obvious from the fact that it gradually diminished in quantity and finally was absent altogether, as indicated by loss of smell. Suspended matter was also immediately determined, as its character in some instances was observed to alter rapidly from the same cause. For this purpose a porcelain crucible with a perforated bottom, covered with asbestos wool, was employed. By this arrangement not only was the total amount of matter in suspension determined, but also the matter volatile on ignition (organic) and that which was fixed (mineral) were ascertained. In all other analytical operations the clear water was used.

With respect to colour determination, the ratios expressed in Table I. below show the proportion of brown to blue in the water, the figures representing millimetres in thickness of the respective standard solutions. Thus 8 : 20 would express a colour composed of 8 millimetres of standard brown solution, superposed on 20 millimetres of standard blue solution (the normal colour of pure water). The organic carbon and nitrogen were determined by the excellent and accurate though somewhat tedious combustion process of Frankland. It consists briefly, first, in the evaporation of the water to dryness, either with sulphurous acid or phosphoric acid, according to the nature of the water, to fix the free ammonia present and to destroy the carbonates, nitrates and nitrites. The residue so obtained is then mixed with perfectly pure oxide of copper and burnt *in vacuo*. The carbon is thus obtained as carbonic acid gas and the nitrogen in the elementary form. By means of the Sprengel pump, these gases are pumped into a suitable tube and afterwards transferred to a gas analysis apparatus for panalysis and measurement.

This process, it may be mentioned, was found to yield excellent results when a liquid containing a known amount of carbon and nitrogen was experimented with. The liquid so used contained an accurately weighed quantity of pure caffeine, so that a thousand parts of the liquid were equivalent to 0·040 part of carbon and 0·023 part of nitrogen. The figures actually obtained in an experiment carried out on the lines just indicated were C, 0·044, N, 0·0225.

The free ammonia was determined in a few instances by distilling a known quantity of the water into acid of definite strength. In other cases the usual process of Nesslerizing the distillate was adopted. The total solid matter in solution was obtained by simply evaporating a given volume of the water to dryness; the hardness was found by the effect produced on soap solution of definite strength. The "oxygen required" was determined by means of an acidified solution of potassium permanganate acting in the cold for fifteen minutes and for three hours. The former result is taken to indicate the extent of very readily oxidisable substances—sulphuretted hydrogen, ferrous salts, nitrites, and probably some organic matter; and the latter obtained after deducting the former to indicate organic matter only. The chlorine was estimated by means of a standard silver solution; the results obtained are calculated into the equivalent of common salt, 100 parts of which contain 60·7 parts of chlorine. Nitrogen, when it occurred as nitrate, was determined by means of phenol sulphonic acid, which is converted by any nitrate present in the water into picric acid and subsequently into yellow ammonium picrate on treatment with ammonia. The yellow colour so produced was compared with a solution of nitrate of known strength similarly treated. Nitrogen existing as nitrite was detected by means of the very delicate reaction taking place between the product of the action of nitrous acid upon sulphanilic acid and amido-naphthalene. A salmon-pink colour due to formation of anazo-compound is produced. Lastly, the microscopic examination of the sediment was made; the results are recorded in Table II.

Having thus touched briefly upon the salient points in the analyses conducted, the results actually obtained (see Table I.) may now be considered. They are expressed in all instances in grains per gallons.

REMARKS ON TABLE I.

A close inspection of Table I. leads to the division of the waters there enumerated into four characteristic groups:

I. Water excessively and grossly fouled with sewage and other animal matter.
II. Water decidedly polluted.
III. Water still polluted, but to a less extent.
IV. Water generally of good quality and organically pure.

TABLE I.

RESULTS OF ANALYSES OF SAMPLES OF WATER TAKEN FROM CHICAGO RIVER AND FROM LAKE MICHIGAN.

Sample No.	Where taken.	Depth in feet.	Temperature. Air.	Temperature. Water.	Current: disturbance.	Colour. Blue.	Colour. Brown.	Suspended matter. Organic.	Suspended matter. Inorganic.	Suspended matter. Total.	Total dissolved solids.	Ammonia.	Initial hardness.	Chlorine. Cl =	Chlorine. NaCl.	Sulphuretted hydrogen.	Oxygen absorbed. 15 min.	Oxygen absorbed. 3 hrs.	Oxygen absorbed. Difference.	Organic carbon.	Organic nitrogen.	Nitrates and nitrites. N =	Nitrates and nitrites. HNO_2.	C : N.
2	Chicago River, north and south fork.	2	24°	37°	No disturbance.	20	Above scale	Small sediment.			25·9	0·3430	10·39	2·52	4·13	*	0·2478	0·392	0·1442	0·923	0·383	*	*	2·41 : 1
3	Chicago River, near mouth.	2	23°	33°	None. No disturbance.	20	8	0·92	3·27	4·19	18·2	*	10·16	0·84	1·38	*	0·0248	0·0469	0·0210	0·126	0·067	0·07	0·215	1·9 : 1
4	Chicago River, near Union Depôt.	3	22°	38°	None. No disturbance.	20	Above scale	4·76	3·78	8·54	25·9	0·672	16·60	2·45	4·01	Traces	0·1269	0·3031	0·1162	1·568	0·458	*	*	3·4 : 1
5	Dupont's Slip.	1	23°	38°	None. Slight.	20	Above scale	2·06	None.	2·66	29·4	0·255	14·72	2·95	4·83	0·714	0·6348	0·7000	0·1652	0·8067	0·546	*	*	1·5 : 1
6	Chicago River, Fuller-street and Rost-street.	1	22°	40°	No movement.	20	Above scale	5·18	5·74	10·92	37·8	1·3160	14·94	7·56	12·40	0·595	0·4020	0·7000	0·2330	1·313	0·4020	*	*	2·8 : 1
7	Canal A.	1	20°	38°	Half a mile from W.	20	Above scale	5·60	3·08	8·68	36·4	1·1900	12·60	3·71	6·08	0·330	0·7056	0·9030	0·1974	1·3657	0·7054	*	*	2·7 : 1
8	Chicago River, 1 mile above Fuller-street.	1	23°	50°	Slight from E.	20	Above scale	12·46	3·08	15·54	150·5	8·400	17·19	55·3	90·70	3·700	4·788	5·600	0·8120	2·228	2·034	*	*	1 : 1
10	Lake Michigan, 4 miles out.	6	21°	34°	Slight from N.W.	20	4	Slight.			11·90	0·0035	7·31	0·56	0·92	*	*	0·0028	0·0028	0·1208	0·0210	0·028	0·126	5·7 : 1
17	Chicago River: just below Fullerton-avenue.	1	24°	34°	None. No disturbance.	20	4	1·43	2·27	3·55	14·00	0·0035	8·26	0·85	1·45	*	0·0192	0·0358	0·0166	0·126	0·0336	0·182	0·819	3·7 : 1
19	Chicago River, 2 miles above Fuller-street.	1	23°	48°	None. No disturbance.	20	Above scale	24·92	34·02	58·94	144·9	11·508	16·63	70·00	114·80	3·004	2·800	4·816	2·0160	2·829	1·055	*	*	2·7 : 1
20	Chicago River, east fork, close to stock-yards.	2	22°	44°	None. No disturbance.	20	Above scale	13·86	6·44	20·30	158·9	11·004	14·61	73·50	120·5	2·26	1·050	1·400	0·3500	3·703	0·6580	*	*	5·6 : 1
21	Illinois and Michigan Canal: off Bridgport.	3	21°	39°	None. No disturbance.	20	Above scale	2·08	—	2·08	25·9	0·966	10·72	3·08	5·07	0·93	1·4320	1·6046	0·2326	0·9792	0·3060	Traces *nitrites*.		3·2 : 1
22	Lake (Dumping Ground).	12	24°	35°	None. No disturbance.	20	4	Slight.			11·2	*	7·04	0·40	0·66	*	0·0192	0·0606	0·0404	0·1148	0·0504	Traces nitrates.		2·2 : 1
23	Lake Michigan (Dumping Ground).	Surface	23°	33°	None. No disturbance.	20	4	0·40	1·260	1·66	15·40	*	7·73	0·43	0·66	*	0·0140	0·0358	0·0218	0·1200	0·0245	Traces nitrates.		5 : 1

* Insignificant.

To Group I. belong the samples 19, 20 and 8. The district from which they were derived is distinguished by full black on the accompanying diagram.

To Group II. belong Samples 6 and 7 and the district from which they were obtained is marked by dark shading on the same diagram.

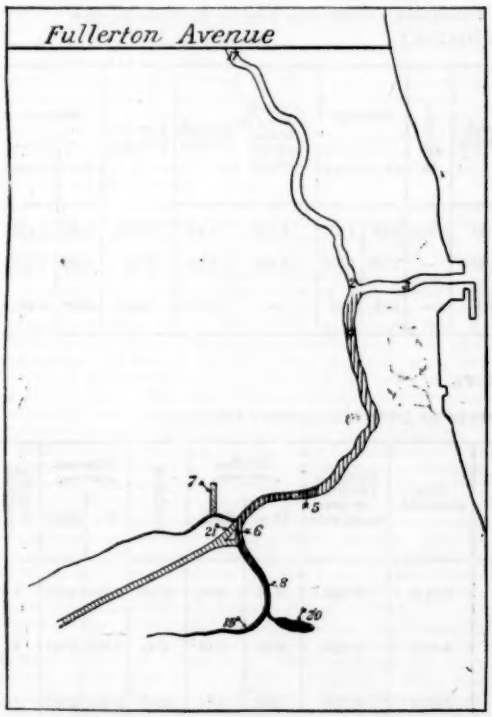
To Group III. belong samples 2, 4, 5 and 21, coming from the part of the river distinguished by light shading.

Lastly, to Group IV. belong the samples 3, 17, 10, 22 and 23, the last three being lake samples. The districts from which the river samples were taken are indicated on the diagram by plain outlines.

Table III. giving the average composition of the members of each group, shows at a glance the chief variations in the analytical results obtained.

It is convenient to consider and discuss the groups *seriatim* and the individual members in each.

DIAGRAM SHOWING CONDITION OF CHICAGO RIVER.



EXPLANATION.—The plain outlines show unobjectionable water (Group IV.). The light shading shows water unmistakably contaminated (Group III.); the dark shading, water very much contaminated (Group II.); the full black, filthy water—very bad sewage (Group I.). The numbers are derived from Map I., and refer to the samples of river water obtained for analysis as explained in connexion with that map.

Group I.—Words could hardly describe the filthy description of the samples belonging to this group. The observations made by our agent in this connexion at the time of collecting the samples and given in Appendix III. are of interest. That very little change had taken place in these samples during their journey to THE LANCET Laboratory was pretty evident from the fact that his observations with respect to the colour and smell of the samples were fully confirmed when they were submitted to analysis. They all evolved the disgusting odour of sulphuretted hydrogen—in fact, on removing the stoppers from the bottles bubbles of gas were seen to escape. On removing the smell of sulphuretted hydrogen by the addition of a solution of iodine to the water the residual smell was even of a more disgusting type, resembling very closely decomposing fæcal matter. During the evaporation of the water to dryness for the estimation of the total solid matter a sickening smell, partly resembling bad glue and partly sewage, pervaded the atmosphere of the laboratory.

A noteworthy feature in the waters of this group, as will be seen from Table III., is the excessive amount of ammonia contained in them, with a corresponding quantity of organic carbon and nitrogen, the relation of these elements indicating excessive pollution with animal matters. This is again confirmed by the enormous amount of chlorine, which calculated into common salt averaged as much as 108 grains per gallon. The suspended matter was black and on ignition evolved an odour of sulphur and of animal hair burning; the fixed residue was brown, from the presence of iron.

Microscopical examination, as a reference to Table II. will show, revealed swarms of bacteria, mainly in the zooglœa stage, as well as low forms of plant life, animal hairs, and mineral matter. Bacterial growth steadily followed on the

TABLE II.

Microscopical Examination of Sediment (River and Lake).

Sample No.	Observations.
2	Swarming with bacteria, diatoms, paramecia, monads and other moving organisms.
3	Bacteria, desmids &c., and silicious matter.
4	Plant products, bacteria, silica and iron.
5	Several groups of bacteria, monads, iron and other mineral matter.
6	Animal hairs, bacteria, plant tissue in abundance.
7	Bacteria, monads, mineral deposits and animal débris.
8	Teeming with bacteria and bacteria fronds, mineral débris &c.
10	Several bacteria, desmids and mineral matter.
17	Few bacteria, diatoms, desmids and plant débris.
19	Several bacteria, mineral matter and plant débris.
20	Bacteria in abundance in well-defined rod-like chains mineral matter &c.
21	Plenty of bacteria, desmids and mineral matter.
22	Few organisms, plant and mineral débris.
23	Bacteria, protococci and plant débris.

The numbers in this table represent the same samples as in Table I.

TABLE III.

Chicago Waters divided into Groups according to Composition, the Figures giving the Average Composition of the Members of each Group.

Constituents.	Group I. (Nos. 19, 20 and 8.)	Group II. (Nos. 6 and 7.)	Group III. (Nos. 2, 4, 5 and 21.)	Group IV. (Nos. 3, 10, 17, 22 and 23.)
Suspended matter	31·6	9·80	3·32	1·90 (Nos. 10 & 17 contained only slight sediment.)
Total dissolved solids	151·4	37 10	26 70	14·14
Ammonia	10·30	1·253	0·5600	0 0014
Initial hardness	16·14	13·770	13·11	8·28
Chlorine	66·26	5 630	2 75	0·62
= Common salt	103 60	9 24	4 51	1 03
Sulphuretted hydrogen, H_2S	3·04	0·46	0 41 (Nos. 2 & 4 contained traces.)	—
Oxygen required	1 05	0 218	0 1643	0 020
Organic carbon	2·92	1·340	1·060	0·123
Organic nitrogen	1 249	0·483	0·421	0 039
N in Nitrates	—	—	0 005	0·055
= Nitric acid	—	—	0 023	0·250 (Nos. 22 & 23 contained only traces.)
Ratio of C : N	2 3 : 1	2 7 : 1	2·5 : 1	3·1 : 1

TABLE IV.

COMPOSITION OF THE WATER OF CHICAGO RIVER (GROUP 1) COMPARED WITH THE COMPOSITION OF CRUDE SEWAGE. (GRAINS PER GALLON.)

Designation.	Total dissolved solids.	Suspended matter.			Organic Carbon.	Organic Nitrogen.	Ammonia.	Chlorine.	Nitrogen as nitrates &c.
		Inorganic.	Organic.	Total.					
Chicago River	151·4	15·20	16·40	31·6	2·92	1·25	10·30	66·26	*
Fresh Sewage	50·54	16·92	14·35	31·27	3·287	1·54	4·69	7·46	0·002

* Insignificant.

TABLE V.

AVERAGE COMPOSITION OF LAKE MICHIGAN WATER CONTRASTED WITH THE PUREST LONDON SUPPLY. (GRAINS PER GALLON.)

Designation.	Colour.		Suspended matter.			Total dissolved solids.	Initial Hardness.	Ammonia.	Chlorine		Oxygen required to oxidise organic matter.	Organic Carbon.	Organic Nitrogen.	Nitrates.	
	Blue.	Brown.	Inorganic.	Organic.	Total.				Cl. =	NaCl				N =	HNO_3
Lake Michigan Water..	20	6	1·43	0·47	1·90	14·14	8·28	0·0014	0·60	1·00	0·020	0·123	0·0039	0·055	0·250
London Supply (river-derived)	20	13	—	—	—	28·05	18·50	—	1·188	1·947	0·040	0·100	0·029	0·270	1·210
London Supply (deep wells)	—	—	—	—	—	26·74	19·6	—	1·61	2·60	—	0·028	0·004	0·303	1·40

TABLE VI.

RESULTS OF ANALYSES OF VARIOUS SAMPLES OF DOMESTIC SUPPLY, CHICAGO.

Number of sample.	Where taken.	Appearance.	Colour.		Total dissolved solids.	Free ammonia.	Ammonia liberated by permanganate.	Chlorine.		Hardness.	Nitrates.		Oxygen required.
			Blue.	Brown.				Cl =	NaCl.		N =	HNO_3	
‡ 27	From a tank of Waukesha Hygeia.	Bright, with slight sediment.	20	22	37·80	0·0140	0·0056	1·89	3·11	27·00	0·700	3·15	*
28	Pasteur filter-water, Monroe-street.	Bright; sediment very slight.	20	22	11·20	0·0056	0·0070	0·42	0·69	9·31	0·014	0·063	*
29	169, La Salle-street.	Bright; some sediment.	20	9	11·20	0·0070	0·0168	0·46	0·75	10·40	0·014	0·063	*
30	3224, Cottage-grove-avenue.	Clear; slight sediment.	20	9	14·00	*	0·0056	0·39	0·64	12·61	0·028	0·126	*
31	Washington Heights Artesian well.	Clear; considerable brownish sediment.	20	12	104·30	0·0392	0·0056	10·78	17·78	43·43	0·014	†0·063	*
32	Harrison-street (water pumped from central station).	Bright; slight sediment.	20	15	10·50	0·0056	0·0042	0·42	0·69	9·10	0·014	0·063	*
33	Opposite North-side pumping station, Chicago-avenue.	Clear; slight sediment.	Above scale		10·50	0·0056	0·0056	0·42	0·69	9·31	0·028	0·126	*
34	Silurian water from ordinary ten-gallon tank.	Bright; very slight sediment.	20	10	30·80	*	0·0042	0·42	6·09	18·62	0·350	1·575	*
35	West Madison-street.	Clear; slight sediment.	20	15	11·90	0·0056	0·0056	0·49	0·80	9·31	0·014	0·063	*
36	Pasteur filter-water from house in Adam-street.	Clear; contained dirty flocculence.	20	11	11·90	Trace.	0·0042	0·42	8·69	8·26	0·021	0·095	*

* Insignificant. † Contained nitrites. ‡ 25 and 26: These samples were lost in transit.

opening of the samples of this group till the water at last became quite opaque. This is not to be wondered at when, as analysis shows, the waters abound not only in nitrogenous matter but also in phosphates. The waters of this group, in fact, would serve as an excellent culture medium for the growth of organisms, so abundantly does pabulum exist. The amount of phosphates is simply phenomenal; on testing each sample in the group as it stood it was found to give an abundant precipitate with ammonium molybdate solution.

Group II.—In the samples of Group II. the kind of pollution is precisely the same—that is to say, it is mainly of animal origin; but the constituents which represent this contamination are smaller in quantity. Thus the salt is reduced to 9·24 grains, the sulphuretted hydrogen to 0·46 grain, the suspended matter to 9·80 grains, the ammonia to 1·25 grains, and the carbon and nitrogen to 1.34 grains and 0·483 grain per gallon respectively.

The observations of our agent at the time of collecting the samples are in accordance with these results. The smell emanating from the samples on opening in the laboratory was objectionable enough, and on evaporation of the waters the disgusting smell of stale sewage was unmistakable. Phosphates were again found in abundance, whilst microscopical examination showed in No. 7 plenty of bacteria, monads and silicious matter, and in No. 6 vegetable débris, animal hairs, low forms of vegetable life and earthy matter. The character of the suspended matter was similar to that contained in Group I. It was black and evolved a disagreeable smell on ignition, and the incinerated residue was brown from the presence of iron.

Group III.—Of the members of this group, No. 21, from the canal off Bridgport, was decidedly the worst. It contained 0·93 grain of sulphuretted hydrogen, whilst No. 5 contained 0·71 and Nos. 2 and 4 only traces. Similar ranges in the quantity of ammonia and chlorine are noticeable.

Unmistakable as the contamination of these waters is, it will be observed that the individual constituents which indicate pollution occur again to a less extent than in the preceding group. The suspended matter in the waters of this group was less in quantity but of the same kind. It evolved a disagreeable smell on burning and left a residue containing iron. The sulphuretted hydrogen smell of these waters was less strong, but on evaporation of the samples to dryness the same disgusting sewage odour was noticeable.

Nitrates, it is interesting to note, occur for the first time to any measurable extent in this group, the amount averaging 0·023 grain calculated as nitric acid; and in one member (the only one of the whole series) nitrites were detected. Phosphates, be it remarked, again abound, and microscopical examination of the sediment showed a similarity in the samples. Thus in No. 2 swarms of bacteria were found, as well as monads and an excellent specimen of diatom; in Nos. 3 and 4 plant débris and bacteria; in No. 5 swarms of bacteria, monads, paramecia; and in No. 21 bacteria, plant débris and mineral matter.

Group IV.—This group is sharply distinguished from the rest by a sudden drop not only in the amount of the constituents which are indicative of animal contamination, but also in constituents of a mineral character. Thus, the ammonia dwindles to a mere trace; the organic carbon and nitrogen also diminish considerably, whilst there is a corresponding increase in the amount of nitrogen in the form of nitrate. These waters are less hard, contain much less chlorine, absolutely no sulphuretted hydrogen, and the oxygen abstracted from permanganate of potassium was practically nil, from which it may be concluded that organic matters are almost entirely absent. The organic nitrogen of No. 3, it should be pointed out, is somewhat higher than the others, and on this account would give rise to some little suspicion. It is suggestive, too, that of the five members included in this group, it was No. 3 that contained a measurable quantity of suspended matter (*vide* Table I.). Nos. 10 and 17 contained a slight sediment only. In addition to this, water fleas were seen swimming about, with the exception of No. 10, which was a sample taken in the lake four miles out. A reference to Table I. will show that three of the members of this group, Nos. 10, 22 and 23, were taken from the lake, and the remaining two, Nos. 3 and 17, were taken from the river at points where either the lake water has free access or is pumped in. A few bacteria, monads, desmids, protococci, regular pond-water organisms, water weeds &c., were discovered in the sediment of the members of this group. Phosphates were still present in this group, though less marked.

OBSERVATIONS AND DEDUCTIONS ON THE FOREGOING RESULTS.

The foregoing results lead to some interesting inferences. Let the forms under which nitrogen is generally found in waters first be considered. Nitrogen may exist in organic matter, in ammonia, or in nitrates and nitrites. When it is present as organic nitrogen in the water present, pollution with objectionable matter of some kind, generally sewage, is indicated; if it is present as ammonia, present and recent pollution may be indicated, but if present in nitrates in the absence of ammonia and organic nitrogenous matter then the pollution is probably an event of the past. Organic matter, in fact, by the natural purifying actions of the air, of the air dissolved in water, aided by specific organisms, rapidly changes into ammonia and eventually into the complete oxidation product, nitric acid or nitrate (bases being present sufficient to neutralize the acid formed). When, however, nitrites are present, both past and present contamination with organic matter is indicated, for nitrites are known to be formed from the reduction of nitrates by organic matter. It is probable therefore that water containing nitrites as well as nitrates has been and is being contaminated. On inspection of Table III. it will be found that both nitrates and nitrites are absent from those waters containing an excess of organic matter and of nitrogen. On the other hand, waters containing traces of ammonia, or no ammonia at all, invariably contain nitrates. This lends support to the views just expressed. The water containing most nitrate is No. 17, and this is a sample of water, it is interesting to note, which was taken from the Chicago River below Fullerton-avenue, just where water is pumped into the river from the lake. The presence of nitrates may there be accounted for by the action of the fresh aerated water of the lake upon the nitrogen contained in the organic matter, or the nitrogen existing in the river as ammonia above this point. Sample No. 3 illustrates again the oxidation of nitrogen taking place. This was obtained near the mouth of the Chicago River—that is to say, where the river water is most likely in contact with or has access to the lake water. The nitrogen as nitric acid amounts to 0·315, whilst as to nitrogen as ammonia, there is none. Traces of nitrates occur also in Samples 10, 22, 23 and 4, and existing pollution is indicated again by the presence of nitrites in No. 21. The entire absence of nitrates in waters containing sulphuretted hydrogen is noteworthy, reduction rather than oxidation being of course indicated.

Now, turning to the chlorine contained in the water, it will be seen that it varies as the ammonia. The presence of large quantities of chlorine may afford evidence of both past and present contamination unless the source of the supply is in close proximity to the sea. Sewage contains on an average seven to eight grains of chlorine per gallon. Inasmuch as the water supply of Chicago—that is, the water of Lake Michigan—does not normally contain according to these analyses more than 0·66 grains per gallon, any quantity found in the water supply greatly in excess of that amount would naturally arouse suspicion. Attention might also be drawn at this point to the somewhat remarkable occurrence of phosphates to a more or less extent in all the samples. Phosphates are a normal constituent, of course, of animal matter, but they also occur abundantly distributed by nature in mineral deposits. We have no evidence whether Lake Michigan contains phosphates normally or not, but the enormous amount of phosphates in the Chicago River, especially near the stockyards, points to pollution with animal excreta; at any rate the presence of phosphates in drinking-water is not desirable, inasmuch as they minister to the growth of organisms.

The initial hardness of the waters would appear to vary directly with the extent of organic pollution, a fact which is probably due to the use of lime salts in many unwholesome industries. The lake water possesses eight degrees of hardness which is tantamount to saying that it contains eight grains of chalk per gallon; it possesses a hardness, in fact, less than half of that of London water.

Next may be noticed the variations in the amount of oxygen absorbed. The river water absorbed large amounts of oxygen consistently with the large amount of organic matter present. Samples from the lake absorbed little or none. The oxygen absorbed by a deep sample of lake water (No. 22) was more than that absorbed by the surface sample (No. 23), obviously because the latter sample at the time of collection had been in prolonged contact with the air. Where nitrates occur the

oxygen required rapidly diminishes; in other words, aeration and consequent purification have already been effected by natural operations. This is especially noticeable in the case of those river samples which have been mixed with the lake supply, to wit, Sample 3 near the river mouth and Sample 17 near the pumping station, Fullerton-avenue.

There is little to remark about suspended matter, as what is recorded in the tables speaks sufficiently. It occurred to a slight extent in all the lake samples, whilst in one surface sample (No. 23) there was sufficient to permit of estimation. Suspended matter in lake water was chiefly inorganic, whilst that from the river was largely organic.

INTERPRETATION OF RESULTS.

The River.—The disgusting condition of the Chicago River has been already made plain from the foregoing observations. With the exception of Samples 3 and 17, which practically consist, as has been shown, of lake water, the whole of the river samples exhibit a composition which in point of impurity vastly exceeds the limits in regard to liquids inadmissible into any stream laid down by the Rivers Pollution Commissioners. The extent of animal pollution in Group I. is appalling. It is of the worst kind, animal refuse being indiscriminately mixed with common sewage. The pollution begins at the very mouth of the river and increases in intensity until a maximum is reached in the vicinity of the stockyards not far from the Southern Branch Pumping Station, where the filthy conditions are such as to defy description.

A glance at the temperature column of Table I. will show that the temperature of the water varied from 33° F. at the mouth to 44° F. at the stockyards, whilst the air temperature was in no case higher than 24° F. It is safe to conclude, therefore, that the condition of the river in summer must be still more abominable.

A comparison of the analyses belonging to this group with the average sewage of towns in England is at once instructive and striking. The results are given in grains per gallon in Table IV.

The Chicago River at these points is even worse than crude sewage, and it is not surprising that the foul emanations and smells arising from the putrefaction of the animal offal and excreta which are evidently discharged into it in the raw state are described as vile, offensive and nauseating. Whether these smells sensibly affect the health of the neighbourhood is a question of importance to decide; the probability is that they do. No one will deny, however, that the existence of nauseating smells in the air is, in the interests of public health, very undesirable, and the inhalation of such offensive air, especially in times when epidemics are prevalent, should be avoided. It is reasonable to suppose further that air so contaminated is also germ laden.

Reference has already been made to the expedient by which a reverse current is induced in the Chicago River by means of pumps situated at the station marked Y on Map I. This arrangement, whilst it serves to maintain a current at the sluggish rate of one-third of a mile an hour and tends to some extent to replace the foul and dirty water of the river with pure lake water, can hardly be expected to affect the branch below Y, which serves the stockyards. The water here is probably quite stagnant, and filth must accumulate day by day.

At Points 6 and 7 on the Map—the latter from a canal immediately opposite 6—samples were taken which formed the members of Group II. (see Diagram Map). These samples represent, therefore, the state of the water below the pumps. Doubtless the pollution of these waters is to a great extent due to the proximity of the branch which leads to the stockyards. Compared with the samples actually taken off the stockyards they are, as might be expected, somewhat less impure, but still of a repulsive character.

Turning to that part of the river which lies between the North and South fork and the pumping station marked Y on the map, we find that the impurities are further reduced. The samples obtained here belong, in fact, to Group III. They were all evidently polluted, but are waters in which the impurities have been attenuated by admixture with other water.

Next comes the northern branch of the river, which, it will be remembered, is swept by a current of lake water pumped into it at Fullerton-avenue—the point marked X on the map—where powerful pumps discharge lake water into the river at an average rate of 10,000 gallons a minute. A sample (No. 17) was obtained just below the station, and another (No. 3) at the mouth of the river; both the samples exhibited the composition of lake water, and are therefore included with the lake waters in Group IV.; but, as might be anticipated, they are in a slight degree less organically pure, being liable doubtless to contamination with river water. One interesting feature presented by these two waters is the amount of nitrates contained in them, which, as has been pointed out, would indicate oxidation of the nitrogen in organic matter effected by the introduction of fresh aërated lake water.

The Lake.—In spite of the dumping process—that is, the discharge of sludge dredged up from the bed of the river into Lake Michigan—chemical analysis fails to furnish any distinct evidence that the lake is seriously polluted. It is well to bear in mind, however, that the sludge must consist to a large extent of insoluble matters, the greater part of the soluble constituents having been dissolved out probably into the river. The sludge would not contain any large amount of chlorides, for instance, for there would be a tendency for these to be washed out by the slow current which is induced to flow from the mouth of the river to the pumping station; but, on the other hand, it would be a matter of surprise if the sludge was free from phosphates, the greater proportion of which, being insoluble, would settle to the bottom of the river. Oddly enough, the lake samples contained distinct quantities of phosphates, but very little chlorine. We do not feel justified, however, in laying any particular stress upon this otherwise interesting observation, as it is quite possible that the presence of phosphate in the lake is, after all, a natural occurrence. There is no mention made, however, of the presence of phosphates in Chicago water in the following analysis made by Professor J. W. Mallet, F.R.S., in 1881. This analysis is interesting, in that the results show a remarkable agreement with those obtained recently in THE LANCET Laboratory. It certainly is remarkable, if it is not significant, that the chlorine, according to this analysis, was distinctly less ten years ago.

The following arrangement admits of an easy comparison between this analysis and that made recently in THE LANCET Laboratory:—

	Chicago water. Analysis made in 1881.	Lake water. Analysis made in 1893.
Appearance ...	Slightly turbid	Slightly turbid
Colour	Blue	Blue
Total solid ...	11·20	11·90
Chlorine	0·14	0·56
Organic carbon	0·093	0·120
Organic nitrogen	0·0217	0·021
Ratio C : N ...	4·5 : 1	5·7 : 1
Ammonia	0·0066	0·0035
Nitrites	None	None
Nitrates	None	0·028
Oxygen required	0·028	0·028

The weights given represent grains per gallon.

It is certain, however, that if the lake were polluted to any serious extent it would contain much more chlorine and nitrogen in some form or other than was shown to be present according to the above analysis.

As a rule, the organic contamination of a lake is rapidly eliminated by atmospheric and other influences, light also being a potent factor, and, whilst pollution may not exist, the presence of oxidised matter—e.g., nitrates—would to an extent indicate past contamination. Nitrates, however, were not found except in minute quantity. This fact cannot be accepted as trustworthy evidence in favour of the view of pollution not having taken place, since in lakes generally vegetation abounds, and nitrates, it is well known, are rapidly absorbed by plant life.

Except for the presence of phosphates there is nothing contained in Samples 22 and 23, obtained over the dumping grounds in the lake, to indicate contamination from that source. Be it remarked, however, and it is satisfactory to note, that the intake sample (No. 10) is a degree purer, chemically speaking, than the dumping-ground samples referred to. It contained a measurable quantity of nitrogen as nitrates, which were present only in traces in the water taken over the dumping grounds; the organic nitrogen was correspondingly lower, whilst the amount of oxygen required to oxidise organic matter was practically *nil*. In all these respects, indeed, the intake sample leaves little to be desired. Of the two dumping-ground samples, the deep sample was a trifle less pure than that obtained at the surface; but the latter sample contained a notable quantity of suspended matter, which was probably floating on the top of the water at the time of collection.

The results of chemical analysis, therefore, lead us to the conclusion that the clear or filtered lake water is comparatively pure. It is of excellent quality and well adapted for both dietetic and other ordinary purposes. In respect of organic purity,

the water of Lake Michigan contrasts very favourably with the water supplied to London. This is strikingly illustrated in Table V., which contains the average analyses of two waters of the London Supply (one river-derived, the other from deep wells) placed side by side with the analysis made in THE LANCET Laboratory of a sample of Lake Michigan water obtained at the intake marked 10 on the map. Thus, in respect of colour, total solid matter, hardness, chlorine and oxygen required to oxidise organic matter, Lake Michigan water is seen to be even superior to the choicest of London's supply.

There is, however, one important difference which cannot be overlooked and that is that in all the samples of lake water there existed sedimental matter. The presence of water fleas also was common to the lake samples with the exception of No. 10. This fact would have passed without comment did we not know that the water is neither stored nor filtered, but distributed exactly as drawn from the lake. It is now known that careful filtration through beds of sand effects not only the complete purification of water from suspended matter, but, what is of greater importance, it removes also any existing organisms. As has been shown, the lake water contains low forms of vegetable life and also quantities of matter in suspension, and as these are likely to find their way into the mains the desirability of taking some precautionary measures of this kind is obvious. In consideration of these facts we counsel the public visiting Chicago to use nothing but boiled and filtered water, in spite of the degree of purity which is indicated by chemical analysis. It is hardly possible now at the eleventh hour for the authorities to provide for the filtration of the Chicago supply on a large scale, but the water can be efficiently filtered as it leaves the tap. We need hardly insist here on the desirability of submitting all domestic filters to periodical cleansing; and, further, that their construction should be such as to provide in addition for the thorough impregnation of the water with air during filtration.

Carelessness in the management of all domestic filters is open to strong condemnation; precautions of the very strictest order should be taken to ensure protection against the contamination of the water that may arise from the accumulation of filth in the pores. All filters should be so constructed that they may be submitted to the heat of boiling water for some time, in order that the filth and the organisms accumulated in their pores may be completely destroyed or removed. Boiling of the water wards off for certain many lurking dangers, whilst it also renders the work of the filter considerably lighter, as by such treatment much of the solid matter dissolved in water is precipitated. Though boiling invariably renders water insipid it renders it quite safe for drinking purposes, and its palatability may be restored by cooling, inasmuch as water at a low temperature is capable of taking increased quantities of air into solution.

In view of the excellent character, so far as chemical analysis goes, of the water of Lake Michigan, which nature has placed, so to speak, at the very door of the city, it is simply suicidal to run the risk that is now being run of seriously polluting so unlimited and pure a supply of water by the ugly dumping process, which consists in throwing Chicago's very worst refuse into its midst. That there are other more rational, more wholesome and more effectual means by which it could be disposed of there can be little doubt. Indeed, the sewage and refuse of Chicago need never be discharged into the river in the raw and crude state in which it is evidently thrown into it now.

TABLE VII.

Microscopical Examination of Sediment (Domestic Supply).

Sample No.	Observations.
27	Few micrococci; algæ and mineral matter.
28	Brown vegetable matter; few bacteria.
29	Vegetable débris; plenty of bacteria; oxide of iron &c. like lake samples.
30	Same as No. 29; desmids, bacteria &c.
31	Brown mineral and vegetable matter; hyphæ and few bacteria.
32	Paramecia, bacteria, plant-tissue, de mids &c.
33	Few bacteria, micrococci, desmids, same as No. 29; dead water-fleas.
34	Swarms of monads, and débris chiefly of vegetable kind.
35	Similar to No. 32; bacteria and plant-tissue.
38	Ordinary pond water organisms; diatoms, few bacteria, infusoria &c.

DOMESTIC SUPPLY.

Elsewhere it is stated that owing to the breaking of eight out of ten samples in the second case sent to THE LANCET offices, which contained specimens chiefly of the domestic supply to Chicago, our agent was instructed to repeat the collection of such samples. This was done, and a few weeks ago the case containing these new samples came to hand. Two bottles of the twelve contained in the case had unfortunately succumbed to the exigencies of travel. It is much to be regretted that one of these was a sample of water taken from a tank in the World's Fair grounds. The other was a sample of the ordinary supply to Chicago taken in a druggist's store in Sixty-second-street.

It is convenient to treat the samples of domestic supply separately, and the results of analysis are therefore recorded in Table VI. In Table VII. will be found also the results of the microscopical examination of the deposits occurring in these waters. A comparison of the analytical results in this table, with the results recorded in Table I., which includes the river and lake samples, will show that the organic carbon and nitrogen were not estimated, the ammonia liberated on boiling the water with alkaline permanganate being introduced in their place. It was simply a matter of convenience to do so, as not only is the carbon and nitrogen process of Frankland very long and tedious, but a larger quantity of water than could well be spared is required to be operated upon. The albuminoid ammonia, as it is called, is, however, a reliable factor, in that it serves to indicate the kind and, to an extent, the amount of pollution from certain sources.

A consideration of these results of analysis shows at once that two distinct classes of waters are being dealt with. To the first class belong Nos. 28, 29, 30, 32, 33, 35 and 36; and to the second Nos. 27, 31 and 34. The former are practically identical in composition with the lake samples, Nos. 10, 22, 23, Table I.; the latter are derived from springs. The points from which all these samples were procured, are sufficiently described in Table VI. Neither is it considered necessary to indicate on the map the localities whence these samples came. The water supplied from the ordinary mains of the pumping stations may be considered first.

Ordinary supply.—Attention has already been drawn to the desirability of filtering the lake water for drinking purposes. The necessity of adopting some precaution of this kind is again obvious when the above results are considered. Not a single sample of ordinary supply or lake-derived water was entirely free from sediment, and the sediment in the majority of instances was found to consist of vegetable *débris* with numerous organisms, chiefly of the pond-water kind.

In sample No. 33, which represents the water pumped by the North Side station supplied to the North Side residents, dead water-fleas were found floating in the liquid. In fact in respect of suspended matter or deposit the water supplied in the mains is, as was predicted, quite as unsatisfactory as the water taken from the lake. From another point of view indeed the samples are even more unsatisfactory. Take the measurement of colour, for instance. Whilst the samples taken from the lake exhibit a remarkable freedom from brown colour, the highest being eight degrees and the other two being only four degrees, the colour of water taken from the mains varied from nine to twenty-two degrees of brown and in one instance (No. 33 again) it was above the scale. This increase of brown tint is probably due to the waters having been in contact with the sediment which not improbably accumulates from time to time in the mains. Iron, again, would impart distinctive colour. We are therefore provoked to repeat our observations in regard to the necessity of filtration. The water supplied to Chicago from Lake Michigan is chemically satisfactory in all respects but one, it contains suspended matter. But with proper and efficient filtration there is nothing, so far as its chemistry goes, to suggest that the water supplied to the city is not well suited for all domestic and dietetic purposes. The residents of Chicago are evidently aware of the desirability of filtration, as it will be observed on inspection of the table that two of the samples (Nos. 28 and 36) had been filtered through Pasteur filters. In spite of this these samples were as bad as, if not worse than, the unfiltered water ordinarily supplied. On the face of it this may appear paradoxical, but the explanation of this seeming anomaly is not far to seek. It is customary in Chicago

apparently at all seasons of the year to float pieces of ice on the water intended for drinking purposes, but no discretion, it is obvious, is exercised as to the choice of a pure and safe ice for this purpose. Indeed, our examination very distinctly indicates that impure ice was melted in the water after filtration. Otherwise how is it that microscopical examination of the deposit of a water passed through a Pasteur filter showed the presence of plant-débris, low forms of vegetable life &c., incident to the surface water of lakes? The ice of a lake or natural water, it need hardly be pointed out, is likely to contain not only the matter in suspension existing in the water, but also the particles floating on the top. Any good, therefore, that may be effected—and there is little doubt that real good is likely to be effected—by the use of a Pasteur filter is as a matter of fact nullified by placing in the water so filtered lumps of ice of questionable purity.

The total solid matter, the hardness, and the chlorine and free ammonia are in close agreement with the results already obtained with lake water. Freedom from any appreciable quantity of organic impurity is exemplified in the fact that the amount of oxygen taken up from a solution which very willingly parts with it amounted to practically nothing. Phosphates were present, but not to the same extent as in the Lake samples; it can only be concluded, therefore, that either they are removed by deposition or else eliminated by living organisms—a phenomenon well known to take place.

OTHER SOURCES OF SUPPLY.

The other sources of supply, already referred to and dealt with in Table VI. are quite distinct. They are as follows: 1. Waukesha Hygeia water which has its origin in the Hygeia Spring, Waukesha, Wisconsin. The water from this spring is to be supplied by a main over 100 miles long to the World's Fair grounds. At present it is supplied to the residents of Chicago in ten gallon tanks. 2. Washington Heights Artesian Well. 3. Silurian Water supplied in Chicago in ten gallon tanks by the Silurian Mineral Spring Company, Waukesha, from springs in Waukesha, Wisconsin.

No. 27—the sample of Waukesha Hygeia—is chiefly remarkable on account of the large amount of free ammonia and nitrogen as nitrates it contains. Now, as has already been pointed out, both ammonia and nitrates suggest contamination. The former is usually the result of putrefactive fermentation of nitrogenous organic matter or the product of the reduction of nitrites and nitrates in presence of excess of organic matter. Be it noted, however, there is an entire and remarkable absence of organic matter in this water, as evidenced by the solid residue obtained on evaporation to dryness, evincing no change when heated, and also by the insignificant amount of ammonia yielded on boiling with alkaline permanganate. Confronted with this important result, we are led to the conclusion that the water is obtained from a very deep source; it has undergone extensive natural filtration and oxidation, and any objectionable organic matter it may have contained originally has been converted into bodies of a harmless kind. This is the natural operation referred to previously, by which water is self-purified and rendered potable. The Hygeia water is perfectly bright and well aerated; it is somewhat hard, but perfectly satisfactory as regards organic purity. The slight sediment it contained was not entirely free from organisms of vegetable origin, as an inspection of the table will show.

Similar in composition to the Waukesha Hygeia water is the Silurian water. It is, however, less hard, and yields absolutely no free ammonia on distillation, but contains a notable amount of nitrogen as nitrate. Its freedom from ordinary organic contamination is unquestionable; but treatment by filtration would benefit it in respect of sediment, which, although slight, contained low forms of vegetable life. The water was quite bright and fresh and agreeable to the taste, and well aërated.

The water from the artesian well of Washington Heights, of which No. 31 is a sample, is sharply distinguished from the two foregoing samples by the large amount of mineral salts in solution (over 100 grains per gallon) and a correspondingly high degree of hardness—43·43. Moreover, it yielded a comparatively large quantity of free ammonia on distillation, whilst it was the only water found to contain nitrites. No distinct evidence of pollution was indicated, but in view of the presence of excessive quantities of ammonia and chlorine, as well as of the fact of its containing nitrites, a sharp look-out on the surroundings of the source of this water becomes desirable. Analysis of this water, and indeed of any other water containing a notable amount of nitrates, should be made from time to time to determine whether they vary in quantity. This would settle all doubt as to the liability of the water to contamination. That it could be improved by filtering is evident, for it contained a considerable brownish deposit, consisting of mineral (iron oxide) and vegetable matter surrounded by moving organisms. The water, apart from this, was bright and possessed a somewhat saline taste. When intended purely for ordinary domestic purposes this water would doubtless be considerably improved by treatment with softening agents.

To sum up, the water supplied to Chicago from Lake Michigan is of good quality throughout, and provided that it be efficiently filtered and boiled no chemical objection to its use as a potable water on the score of organic impurity can be raised. That it is liable to very serious pollution so long as the vilest refuse of the city is thrown into the lake has already been pointed out, but there is no evidence to be gleaned from the results of chemical analysis that this, up to the present time, has actually been a source of mischief to the water. There is not sufficient information for considering accurately the effects upon health, though the high death-rate of the city from typhoid fever needs inquiry.

In regard to the water-supplies of Chicago from other sources—namely, two from Waukesha and one from the artesian well of Washington Heights—they are less well adapted for ordinary washing and manufacturing purposes, but in respect of organic purity they are equal, and probably far superior in character, to the ordinary supply. The waters derived from the pure sources of a spring or deep well may of course be more confidently recommended for drinking purposes, especially when it is known that a serious risk of the pollution of Lake Michigan exists.

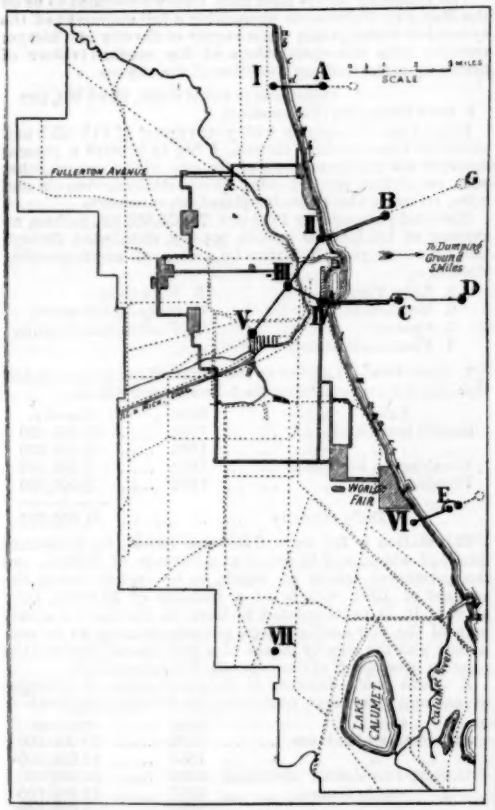
APPENDIX I.

THE DRAINAGE AND WATER-SUPPLY SYSTEMS OF CHICAGO.

The water-supply of Chicago is drawn from Lake Michigan by a number of pumps distributed over the city. The water is neither stored nor filtered, but distributed exactly as drawn and may therefore be expected to exhibit when served out for use the characters of the lake water in those parts of the lake from which it is derived. The city extends for some twenty miles along the shore. It comprises an area of about 180 square miles, having therefore an average breadth inland from the lake of about nine miles. This area includes large districts that are only very sparsely populated, but in its more central parts the population is very dense and the whole amounts at the present time to nearly a million and a half.

The pumping stations are six in number and constitute three systems which may be appropriately described as the northern, central and southern systems respectively. This statement ignores a small supply drawn from an artesian well which serves the recently annexed district of Washington Heights. It should perhaps here be said that Chicago is naturally divided by the Chicago River into three districts: the north, between the northern branch of the river and the lake; the south, between the southern branch of the river and the lake; and the west, which lies wholly inland between the two branches of the river. These natural divisions are recognised in practice and observed in ordinary speech and for many municipal purposes, but they do not correspond to the several systems of water supply. Thus the northern supply system comprises one pumping station only—which is known as Lake View and supplies a part of the north of the town (I. on Map II.). The central system comprises four pumping stations—namely, North Side (II.), Central (III.), South Side or Fourteenth-street (IV.), and West Side (V.), which are all so connected together as to form one organisation drawing water from a number of intakes, which they use in common, and capable of supplementing one another in any way that may be desired. The Southern System comprises one station only, situate in Sixty-eighth-street, close to the World's Fair grounds and known as the Hyde Park or Sixty-eighth-street Station (VI.). The Washington Heights Station is marked VII.

MAP II.—SEWERAGE AND WATER-SUPPLY SYSTEMS.



EXPLANATION.

I. Lake View Pumping Station.
II. North Side ,,
III. Central ,,
IV. Fourteenth-street or South Side Pumping Station.
V. West Side ,,
VI. Sixty-eighth-street ,,
VII. Washington Heights ,, (Artesian Well).
A. Intake for Lake View Pumping Station. The dotted line indicates a tunnel and intake in course of construction.
B. Intake off Chicago-avenue.
C. Two-and-a-half mile intake.
D. Four-mile intake.
E. Sixty-eighth-street intake.
G. Tunnel and intake in course of construction.
a. Grand-avenue Sewer Outfall.
b. Bryn Mawr ,,
c. North Fifty-ninth-street ,,
d. Lawrence-avenue ,,
e. Graceland-avenue ,,
f. Grace-street ,,
g. Roscoe-street ,,
h. Belmont-avenue ,,
j. Surf-street ,,
k. Twelfth-street ,,
l. Twenty-second-street ,,
m. Thirty-fifth-street ,,
n. Forty-first-street ,,
p. Forty-third-street ,,
q. Forty-fifth-street ,,
r. Fifty-first-street ,,
s. Fifty-third-street ,,
t. Fifty-sixth-street ,,
v. Strand ,, (This is not indicated on the map, as the Strand District is not shown on any map of Chicago in our possession).
w. South Chicago-avenue Sewer Outfall.
z. Ninety-fifth-street ,,
x. Fullerton-avenue Pumping Station, for flushing river.
y. Canal Pumping Station, for reversing river current.
These are marked X and Y respectively on Map I.
The dotted lines upon the map inland represent railways. In the lake they represent tunnels and intakes in course of construction.

Before proceeding to describe the water intakes we may with advantage deal with the sources, or rather channels, of pollution. These also may be divided into three groups, viz.:

1. The Chicago River.
2. The Calumet River.
3. The sewers draining the Lake Shore districts.

With respect to the rivers, it may be explained that they serve as main sewers to the districts through which they flow; the sewers upon the lake shore pour their contents without treatment of any sort into the lake.

Of these three channels of sewage pollution, the most important by far is the Chicago River; and so far as this is concerned an attempt has been made to mitigate the evil of lake contamination by means of an artificially induced current, which flows from the lake into the river. This current is maintained by pumps situated in the southern branch of the river, which pump the river water over a dam (*y* in the Map) at the rate of 52,000 cubic feet a minute. This operation enables it to find its way into the Illinois River, which belongs to the Mississippi system; so that ultimately the drainage of the Chicago River, diverted from its natural course, finds its way into the Mississippi and so into the ocean. In seasons of storm and heavy rain the Chicago River follows its natural course and in spite of pumping operations pours its contaminated water into the lake. But this is exceptional; in ordinary circumstances the pumps prevail and induce in the southern branch of the river a flow which towards their end of the river attains to a speed of about one-third of a mile an hour. In another way, however, the river is a source of much more serious contamination to the lake. Its current being so slow as it is and its water being surcharged with sewage matter in suspension, there is naturally a considerable deposit of solid matter in its channel, which has to be kept clear by constant dredging. The sludge taken from the river bed is deposited in the lake five miles from the shore and gives rise, of course, to serious pollution of the lake water in the vicinity of the dumping ground shown in Map I. (Nos. 22 and 23).

The Calumet River is less considerable as a source of pollution than the Chicago River, for the simple reason that it flows through a district much less densely populated than does this latter. From our present point of view it demands consideration on account of the circumstance that it debouches into the lake at no great distance from the spot where the Exhibition is to be held and is the principal source of contamination of the southern water-supply, upon which the Exhibition will be dependent. It will be seen from the letter of Mr. City Engineer Geraldine to Mr. Commissioner Kuhns of the 4th ult., which appears in Appendix II., that the sewage of the Calumet cannot pass into Lake Michigan in a crude state, except in time of flood; but as to the means by which this is prevented we have no information.

The lake shore sewers are indicated by the small letters *a* to *z* in Map II. Concerning them it is not necessary to add more than that they discharge their contents untreated into the lake.

It will now be easy to work out the bearing of this sewage discharge upon the water-supply, regard being had to the positions in the lake from which the various systems draw their water.

The northern system pumping station, situate in Sulzer-street, is marked I. upon the map, and a tunnel and intake crib—the latter marked A—are shown. This intake is placed rather more than a mile from the shore. Another crib, also shown by broken outlines on the map, will shortly be brought into use, it is hoped during the coming summer. It will be situated 10,500 feet from the shore. This northern system is not, from our point of view, a matter of great importance. It supplies a district remote from the principal railway stations and from the Exhibition, and will therefore be but little frequented by visitors.

The central system, which comes next in local order, is the largest and most important of the three, since it supplies not only the greatest part of Chicago but also that part in which probably the great majority of the English visitors will dwell during their sojourn in the city. It comprises the four pumping stations marked II., III., IV., and V. in the annexed map (No II.), which are inter-connected as shown, and obtain supplies from three cribs marked B, C and D on the map. The chief source of contamination here is the Chicago River, which affects the intakes in two ways: in the first place by its outflow carrying suspended sewage matters, and in the second by the deposit in the lake of the river sludge dredged from its channel. Reference has already been made above to the

expedient by which a reversed current is induced in the river by means of pumps situated at the station marked *y* on the map, which transfer the water into the Illinois Canal. These pumps are apparently effective to the extent of preventing the flow into the lake of the very foul water which accumulates from the stockyards and other sources of pollution in the southern branch of the river. The northern branch of the river is swept by a stream pumped into it at Fullerton-avenue—the point marked *x* on the map—where powerful pumps discharge lake water into the river at an average rate of 10,000 gallons a minute. Operations are in progress at the present time for superseding the canal pumping station *y* by means of a deepened channel cut across the high ground intervening between the city of Chicago and the slope drained by the Illinois River. This trench when completed will afford a bed upon which the water of the Chicago will gravitate down into the Illinois River, and will doubtless prove much more efficient than the present arrangement; but this work is not expected to be complete before the year 1895, and therefore, although a matter of prime importance to dwellers in Chicago, is of no significance whatever from our present point of view.

With regard to the disposal of the Chicago River sludge greater difficulties arise. In the first place, the dredging operations are not conducted upon any systematic plan. A certain amount of dredging is done by the urban authorities; but this is, we believe, confined to certain spots in the river, such, for example, as the waterway under bridges and the like. Much of the dredging is done by private enterprise, and it is of course difficult in those circumstances to enforce the strict observance of even the most necessary precautions. Steps have, we believe, been recently taken to secure a better control of the dredging work and especially to enforce the observance of the rules as to the selection of dumping grounds and the avoidance of other parts of the lake than those officially designated for this purpose. From the map (No. I.), in which the dumping grounds are shown, it will be seen that they are situated within two miles of the intake marked D. This proximity is probably to be accounted for by the fact that the dumping ground was selected long before the crib and its tunnel, which are the latest additions to the waterworks of Chicago, were designed. Whether it is intended, or indeed possible, to use other dumping grounds in future, we do not know. The inconvenience and even peril of the arrangement shown cannot possibly have escaped the notice of the city authorities, and it is probable that when public attention has been called to the matter they will be able to make reassuring announcements upon the subject.

Another danger and one of a peculiarly insidious character resulting from the imperfect dredging of the Chicago River must be kept in view in this inquiry. An enormous shipping traffic has sprung up upon the American lakes, which has converted Chicago into one of the five or six largest ports in the world. The craft carrying on this traffic find great inconvenience in navigating the river through the silting up of its channel, and it seems impossible to doubt that they carry river mud adhering to their bottoms far out into the lake. This, though not a source of pollution on any considerable scale, might easily become the means of occasional infection of the water supply.

The southern system, like the northern, is represented by a single pumping station, marked VI. upon the map. Its intake is marked E, and situate about one mile from the shore, with which it is connected by a tunnel of six feet diameter. The single station is equipped with very powerful pumping machinery, to which an addition has recently been made of pumps which will deliver 24,000,000 gallons daily, this being the estimated requirement for the special purposes of the Exhibition. This intake is exposed to contamination both from the south shore sewers and the Calumet River, and its position is, we believe, considered by the city authorities to be for this reason unsatisfactory. Such as it is, however, it is the source from which must be derived the water to be supplied in Jackson-park and the entire southern district of Chicago. This, therefore, is, next to the central supply, that which most nearly concerns visitors to the Exhibition. Within the Exhibition grounds the lake-supply will be supplemented by an entirely independent service of spring-water provided by the Waukesha Hygeia Mineral Spring Company, which has laid extensive water mains for distributing, and has connected its spring at Waukesha with the Exhibition grounds by something like 116 miles of water-pipe. This water is to be sold at one cent a glass.

APPENDIX II.

The following letters have been kindly forwarded to us by the Mayor of Chicago as comprising a full statement of the systems of drainage and water-supply of the city of Chicago, together with the observations of the medical officer of health upon the sanitary condition of the city:—

Department of Public Works, March 2nd, 1893

E. Louis Kuhns, Esq., Commissioner.

DEAR SIR,—Complying with your request of Feb. 20th and pencilled memorandum thereon, I beg to present a general report of the water resources of the city of Chicago, together with an outline map showing pump stations, tunnels and cribs, referring also to contemplated improvements.

The total pumpage for 1892 was 71,035,462,221 gallons, an average of 195,000,000 gallons per day, distributed through the mains as potable water by means of seven pumping stations:—

1. Lake View.
2. North Side.
3. Central.
4. Fourteenth-street.
5. West Side.
6. Sixty-eighth-street.
7. Washington Heights.

1. *Lake View.*—Located at the corner of Sulzer-avenue and Halstead-street, containing the following engines:—

Style.	Date.	Capacity.
Gaskill horizontal	1892	12,000,000
,, ,, ...	1886	12,000,000
Worthington horizontal	1882	5,000,000
Flanders ,, ...	1892	2,000,000
Daily capacity		31,000,000

This station is fed by a 6 ft. brick tunnel, the temporary intake of which, now in use, is at a distance of 6500 ft., and the permanent intake of which, to be opened during the summer of 1893, will be at a distance of 10,000 ft. from shore. It is contemplated to have in the north-westerly part of the city another large pumping station, to be connected with the lake by means of a land tunnel joined to the existing lake tunnel system opposite Chicago-avenue.

2. *North Side.*—Located at the intersection of Chicago-avenue and Pine-street, containing the following engines:—

Style.	Date.	Capacity.
Pittsburg double beam	1872	36,000,000
,, ,, ,, ...	1867	18,000,000
Gaskill, two double horizontal	1886	24,000,000
,, single beam...	1857	12,000,000
,, ,, ...	1853	8,000,000
Daily capacity		98,000,000

The two last-named engines are not very often used now, and it is the intention to install in their place in the near future more powerful and modern engines. This station derives its water from the original crib two miles out in the lake, the connexion being two brick tunnels 5 ft. and 7 ft. respectively in diameter. There is also an emergency tunnel 7 ft. in diameter leading to a new crib on the north-west end of the outer Government breakwater.

3. *Central.*—Located on Harrison-street, between Harrison and Desplaines-streets, completed in 1891 and containing the following engines:—

Style.	Date.	Capacity.
Allis triple expansion	1891	18,000,000
,, ,, ...	1891	18,000,000
Daily capacity		36,000,000

This station is connected both with the land tunnel, 7 ft. in diameter, leading to the West Side station, and with the 7-ft. land tunnel, which is a ramification of the new four-mile lake tunnel described subsequently.

4. *Fourteenth-street.*—Located at the corner of Fourteenth-street and Indiana-avenue in 1891, deriving its water from the New Four-mile Tunnel through an 8-ft. land ramification, but also connected with the old 7-ft. land tunnel by means of a tunnel tapering from 5 ft. to 2½ ft. on Desplaines-street and a 6-ft. tunnel on Jefferson-street, and containing the following engines:—

Style.	Date.	Capacity in gallons.
Allis triple expansion	1892	18,000,000
,, ,, ...	,, ...	18,000,000
,, ,, ...	,, ...	18,000,000
Daily capacity		54,000,000

Space remains for another engine of at least the same capacity as the present ones, which should be arranged for as soon as possible.

5. *West Side.*—Located at the intersection of Ashland-avenue and Blue Island-avenue, completed in its first half in 1876, and containing the following engines:—

Style.	Date.	Capacity in gallons.
Double beam Corliss	1876	30,000,000
,, ,, ...	1883	30,000,000
Daily capacity		60,000,000

It derives its water from the original two-mile crib by means of an extension across the town of the 7-ft. brick tunnel mentioned above as feeding the North Side station.

6. *Sixty-eighth-street.*—Located at the corner of Sixty-eighth-street and Oglesby-avenue, whence a 36-in. water main has been laid to supply water to the World's Columbian Exposition, which will be an independent and direct connexion, with two new Gaskill engines of 12,000,000 gallons capacity each, thus being enabled to send the entire output to the Exposition grounds if needed. This station now contains the following engines:—

Style.	Date.	Capacity in gallons.
Cope-Maxwell	1882	6,000,000
Gaskill	1886	12,000,000
,, ...	1888	12,000,000
,, ...	1892	12,000,000
,, ...	1892	12,000,000
Worthington	1890	12,000,000
Holly vertical	1881	8,000,000
Knowles	1878	3,000,000
Daily capacity		77,000,000

It is proposed to do away as soon as possible with the 6,000,000 gallons Cope-Maxwell, the 8,000,000 Holly vertical and the 3,000,000 Knowles, all of which are out of date, out of repair, and expensive in operation, and to replace them with a single high-duty modern pumping engine of about 18,000,000 gallons capacity. This station is fed by a 6 ft. lake tunnel off Sixty-eighth-street, details of which are given under the heading "Tunnels."

7. *Washington Heights.*—Located on Vincennes-avenue, near One Hundred and Fourth-street, and deriving its water from an Artesian well of a daily capacity of 500,000 gallons.

PUMPING PLANTS FOR CLEANING THE CHICAGO RIVER.

The *Fullerton-avenue Station*, of a capacity of about 12,000 cubic feet per minute, erected in 1879 at Fullerton-avenue and the north branch of the Chicago River for the purpose of flushing the latter, draws fresh water from the lake through an intake off Fullerton-avenue and a cross-town 12 ft. tunnel and houses a vertical engine with horizontal shaft bearing two propeller wheels which force the lake water into the river against a head of about 2 ft., and this creates a flow in the north branch towards the junction with the main river and thence down the south branch towards the canal pumping station.

The *Canal Pumping Station*, located at Ashland-avenue near the Illinois and Michigan Canal, was erected in 1882 for the purpose of lifting the contents of the Chicago River into the Illinois and Michigan Canal at the rate of 60,000 cubic feet per minute. It houses four sets of centrifugal pumps of a nominal capacity of 15,000 cubic feet per minute each, which are now being exchanged gradually for four sets of undulating pumps of a contract capacity of 25,000 cubic feet per minute each against a head of 6 ft., under a contract with the Courtwright Hydraulic Machinery Company. The term of completion is July 8th, 1893, so there would be a capacity of 100,000 cubic feet per minute from that day on.

TUNNELS.

Of these there are four systems:—

1. Lake View.
2. Two Mile.
3. Four Mile.
4. Sixty-eighth-street.

1. *Lake View.*—Mentioned under the heading of Lake View Pumping Station. This is a 6 ft. tunnel, and has a capacity of 72,000,000 gallons per twenty-four hours.

2. *Two Mile.*—The tunnels terminating at the two-mile crib have a diameter of 5 ft. and 7 ft. respectively, as mentioned above, and an aggregate daily capacity of 158,000,000 gallons. If the shore gate of the 7 ft. inlet tunnel terminating at the exterior Government breakwater (see under North Side Pumping Station) were to be opened fully, the aggregate capacity would be upwards of 220,000,000 gallons, one-half of which would be furnished by the short emergency tunnel. This has never been done. It is contemplated to extend this 7 ft. shore inlet tunnel to the two-mile crib, join it with the 5 ft. and 7 ft. tunnels terminating there into a single 13 ft. or a double 10 ft. tunnel, and extend the system thus simplified to a point four and a half miles from shore, where a new intake would be constructed. The capacity of this system would be 270,000,000 gallons per twenty-four hours.

3. *Four Mile.*—The new four-mile tunnel, which was completed in November, 1892, has a diameter of 8 ft. and a daily capacity of 140,000,000 gallons. The new pumping stations on Fourteenth and Harrison-streets derive their water from this tunnel, as mentioned above.

4. *Sixty-eighth-street.*—This tunnel has its present (submerged) intake one mile from shore, a diameter of 6 ft. and a capacity of 72,000,000 gallons. For the purpose of improving the quality of the flow it is being extended as a 7 ft. tunnel to a point two miles from shore under a contract with Messrs. Lydon and Drew of this city, which sets the date of completion of the new work and of filling the extended tunnel with water from the new intake at Feb. 20th, 1893. The city intends to establish, in addition to the two cribs and shafts with three working faces provided in the contract, two more cribs and shafts, increasing the number of working faces to seven, and thus expects to pump water from the new intake by July 1st, 1893. The quantity of the flow is not altered by the extension.

SUMMARY OF PRESENT CAPACITIES.

I.—Pumping Stations.

	Gallons.
1. Lake View	31,000,000
2. North Side	98,000,000
3. Central...	36,000,000
4. Fourteenth-street	54,000,000
5. West Side	60,000,000
6. Sixty-eighth-street	77,000,000
7. Washington Heights (Artesian well)	500,000
Total capacity for twenty-four hours	356,500,000

II.—Tunnels.

	Gallons.
1. Lake View	72,000,000
2. Chicago-avenue	220,000,000
3. Four Mile	140,000,000
4. Sixty-eighth-street	72,000,000
Total capacity for twenty-four hours	504,000,000

Outline map enclosed.*

Yours truly,

DION GERALDINE, City Engineer.

Department of Public Works, March 3rd, 1893.

E. Louis Kuhns, Esq., Commissioner.

DEAR SIR,—I beg to supplement my report of this morning with the following, relative to the sewage of the city: About 85 per cent. of the entire sewage of the city is discharged into the Chicago River, thence by the agency of the Canal Pump Works through the Illinois and Michigan Canal into the Desplaines River and thence into the Mississippi.

Yours truly,

DION GERALDINE, City Engineer.

Department of Public Works, March 4th, 1893.

E. Louis Kuhns, Esq., Commissioner.

DEAR SIR,—Eighty-five per cent. (85 per cent.) of the total sewage of the city, and especially the whole of the sewage of the business and manufacturing parts of the old city, is discharged into the various branches of the Chicago River, and indirectly, by means of the Bridgeport Canal pumping station, aided by the Fullerton-avenue flushing station, both of them described above into the Illinois and Michigan Canal, thence into the Desplaines River, thence into the Illinois River, thence into the Mississippi River.

By far the greater portion of the remaining 15 per cent. of the total sewage of the city is furnished by districts devoted exclusively to residence and park purposes and is discharged directly into Lake Michigan through the following

* The data of this map have been incorporated in Map II.—ED. L.

sewer outfalls, distributed along a shore line twenty miles in length :—

	Feet in Diameter.		Feet in Diameter.
Lake View :		*Old City :*	
Grand-avenue Sewer ...	4	Twelfth-street	5
Bryn Mawr	4	Twenty-second-street ...	6
North Fifty-ninth street	4	Thirty-fifth-street... ...	6
Lawrence-avenue	4	*Hyde Park :*	
Graceland-avenue... ...	2	Forty-first-street	4
Grace-street	3	Forty-third-street... ...	2½
Roscoe-street...	3	Forty-fifth-street	4
Belmont-avenue	2½	Fifty-first-street	5
Surf-street	3	Fifty-third-street	2½
		Fifty-sixth-street	4½

A very small portion of the 15 per cent. of the total is furnished by the manufacturing district in the Calumet basin and is discharged into the Calumet River, whence it cannot pass in its crude condition into Lake Michigan except in time of flood. The following are the sewer outfalls of this district :—

Strand ... ... 5 feet.	Ninety-fifth street ... 4 feet
South Chicago-avenue 5 ,,	

The board of trustees of the sanitary district of Chicago are now constructing, under authority of an Act of the Legislature of the State of Illinois, a combined drainage channel and navigable water-way of very large dimensions, which, when completed, will carry a *gravity flood of 600,000 cubic feet per minute* from Lake Michigan through the Chicago River, and eventually, it is expected, through the Calumet River also into the Desplaines, Illinois and Mississippi Rivers, superseding the present Illinois and Michigan Canal. It is intended to carry intercepting sewers along the lake shore and to discharge them into the river flow away from the lake. In this manner Lake Michigan will be protected absolutely and at all times against the entrance of any sewage from the city of Chicago.

Yours truly,

DION GERALDINE, City Engineer.

Department of Health, City of Chicago, March 7th, 1893.

To His Honour the Mayor.

I have the honour to report, in pursuance to your request for information concerning the supply of water, quality &c., that never before in the history of Chicago, population considered, have there been as few deaths as during the past fourteen months.

A year ago I caused to be made an examination of each case of typhoid fever reported where death resulted, and of the four hundred and over there were less than 5 per cent. of the cases where the attending physician ascribed the cause of death to the water supply. In many instances the patients were newcomers and had not become acclimatised, and it is possible and probable that they were more susceptible than they would have been under other circumstances. This may in a measure have accounted for the increased number of deaths during some portions of the winter of 1891-92 and should not properly be attributed to the water-supply of the city. At intervals during the past two years analyses of the water have been made, and with few exceptions—and then under conditions of wind and weather that made it not a fair test—the quality has been equal, if not superior, to that of any of the large cities of the world. The conditions that now exist are sure to gratify the expectations of the most sanguine so far as an ample supply of pure and wholesome water is concerned.

As will be seen in the report of the city engineer 85 per cent. of the sewage of the city runs into the Chicago River and by means of pumps is transferred to the canal and thence out of the city ; the very small proportion of sewage remaining which flows into the lake is at remote points from the intakes of the tunnels. The tunnels being situated two and four miles from shore makes it almost an impossibility, from their positions in the lake, to admit of any contaminations to the water-supply.

I readily appreciate the importance of this question to those who are contemplating a visit to this city during the World's Fair and assure you that, judging from the results of the analyses, the conditions which surround the procuring of water would lead me to believe from a medical standpoint that, unless some unforeseen accident should arise, our thousands of visitors will have no cause for complaint at the quality of water furnished.

I have the honour to be respectfully yours,

JOHN D. WARE, M.D.,
Commissioner of Health.

Deaths from Typhoid Fever during the years 1890, 1891, 1892, and January and February, 1893.

	1890.	1891.	1892.	1893.
January	53	67	311	41
February	136	61	187	30
March	103	71	76	—
April	45	136	56	—
May	82	408	70	—
June	107	167	55	—
July	86	200	211	—
August	115	182	179	—
September	95	198	138	—
October	72	171	92	—
November	67	150	67	—
December	47	186	47	—
	1008	1997	1489	71
Total deaths...	21,856	27,754	26,219	
Percentage of deaths from typhoid fever	4·61	7·19	5·67	

The following letter, under date March 21st, 1893, has been received direct from Dr. Ware :

DEAR SIR,—Your letter of March 8th to his Honour Mayor Washburne has been forwarded to me. The contents have been noted. In reply, will say had it not been for sickness I should have forwarded a reply before this date. I did not see the report that was forwarded to you some days since from his Honour, but I am assured that the plans &c. contained in that report were absolutely correct ; and in addition to that I forward you to-day two reports of analyses of the drinking water supplied to the city of Chicago, under date of Jan. 13th and March 16th. These analyses were made from water as it was drawn from the hydrants and not taken from out in the lake. The analyses shown were made by Professor Walter S. Haines, and it would seem there is very little to complain of in the character of our drinking water, notwithstanding so many adverse criticisms to the contrary. I trust that these may be in time to be included in former statements sent you.

I have the honour to be, Sir, respectfully yours,

JOHN D. WARE, Commissioner of Health

[COPY.]

Date, Oct. 10th.

Nitrogen as ammonia	0·006
,, albuminoid ammonia... ...	0·123
,, nitrates	0·016
Total nitrogen	0·145
Chlorine	2·9

Date, Oct. 13th.

Nitrogen as ammonia	0·0104
,, albuminoid ammonia... ...	0·122
,, nitrates	0·020
Total nitrogen	0·1524
Chlorine	2·85

Date, Oct. 15th.

Nitrogen as ammonia	0·0092
,, albuminoid ammonia... ...	0·094
,, nitrates	0·030
Total nitrogen	0·1332
Chlorine	2·95

Expressed in parts per 1,000,000.

Parts per 1,000,000 of water.

Nitrogen in ammonia	0·0144
,, albuminoid ammonia	0·0840
,, nitrates	0·0640
Total nitrogen	0·1624
Chlorine in chlorides	2·7

Parts per 1,000,000 of water.

Nitrogen in ammonia	0·056
,, albuminoid ammonia	0·056
,, nitrates	0·020
Total nitrogen	0·132
Chlorine in chlorides	2·6

APPENDIX III.

COLLECTION OF SAMPLES.

The following instructions were issued to our agent in Chicago for his guidance in the collection of samples. His report upon the operations and the log which he compiled of the expedition are also appended.

DIRECTIONS FOR MANIPULATING THE SAMPLE BOTTLES AND TAKING SAMPLES.

The cases will be found to be perfectly easy to open, being fastened only with screws. The inner case may, if necessary, be withdrawn from the outer by means of the handles upon its lid, before the lid is unscrewed; but probably it will not be necessary to withdraw it.

The bottles are numbered 1 to 24, and an accompanying paper gives the particulars concerning the taking of the samples which are required. The particulars may be conveniently entered in a small note-book and arranged in the form shown in the margin hereof. If through inconvenient surroundings any of the original notes should be illegible or difficult to read, an explanation may with advantage be added, but no attempt should be made to use ink or otherwise convert them into anything but rough notes.

A sinker accompanies the bottles, which may be used in the following manner. The bottle is introduced into the tin holder and made fast therein by means of the wire strap which passes over its shoulder. The glass stopper is then to be withdrawn and the cork stopper substituted in its place. The weight must next be attached to the bottom of the tin holder and the whole sunk to the required depth as indicated by the metal tabs upon the suspending cord. This done, a pull upon the stopper cord will draw the cork and the bottle will fill. The bottle is then to be drawn gently up to the surface and the glass stopper introduced whilst the neck is still immersed. The bottle may then be taken out of the water and the stopper tightened in its place, after which it should be immediately tied up with string. When home or a convenient stopping place is reached the parchment caps must be placed over the stoppers, the stoppers tied on and the string sealed. The caps are to be made lissom by soaking them in water for a few minutes before use.

For return the covers of the cases may be planed clean and the address stencilled on in place of that at present upon them.

For the benefit of our readers we give above a drawing of this sinking apparatus.

REPORT ON THE COLLECTION OF SAMPLES OF LAKE MICHIGAN AND CHICAGO RIVER WATERS.

On Saturday, December 10th, 1892, at 8 A.M., I started to go to Dunham's, 210, South Water-street. I had previously placed twenty of the bottles received from THE LANCET Offices in the waggon, and I rode down to Dunham's with them. Immediately upon arrival there I was introduced to Captain William Smith, who was directed to accompany me on my expedition and to lend me every assistance in his power to enable me to take, as carefully as possible, the samples of Lake and Chicago River water I was instructed to collect. I was on board the *Bob Teed* at 9 A.M., and as there was but a slight wind blowing the captain deemed it advisable to proceed at once out on the Lake.

Our first stoppage was at a distance of two miles off the Court House. When the tug was at a complete standstill Captain Smith assisted me in taking samples of the water of Lake Michigan, at a depth of six feet below the surface and also at the surface. Both operations were carried out according to instructions received from you. In my notebook you will find details as to the temperature of the water and also of the air, and the result of other observations you requested me to make. These notes were written down as each sample was withdrawn from the water, and no alteration whatsoever has been made to them. Our next stoppage was at four miles off the Court House, where I took two samples of Lake water—the first at six feet below the surface, and the second at the surface—adhering strictly to your instructions and duly noting my observations in the book I am forwarding to you.

I took two more samples of the Lake water at a distance of five miles from the Court House, near the dumping grounds. These samples were taken at the surface and at a depth of twelve feet. The details are in the notebook.

I may here remark that Captain Smith is one of the most capable pilots on Lake Michigan and that he has been navigating that lake for the last fifteen years. His estimates of distances may therefore be assumed as absolutely correct. Personally, I was guided by the Two Mile Crib and the Four Mile Crib, and I feel perfectly convinced that we stopped at two, four and five miles respectively off the Court House.

The operations on Lake Michigan were then terminated and we made headway for the river. Our first stoppage was at Wabash and Rush (Rush-street-bridge), where one sample of Chicago River water was taken at two feet below the surface. As each sample was withdrawn from the water I fixed the glass stopper firmly and placed a label on the bottle with its number, which number corresponded with a page in my note-book, so that no error was possible. Each bottle furthermore was carefully replaced in the box in which I had taken the bottles aboard the tug, and, to ensure against possible mistakes, I inscribed on the box itself, near the corner in which each bottle was placed, the number of the label. When I returned to my rooms I wrote out another set of labels with pen and ink and placed them on their respective bottles, after which I covered the stoppers with parchment and tied them up firmly. Finally I sealed all the bottles, and with them have returned to you the thermometers employed, my note-book and the seal employed by me.

After Rush-street-bridge the next sample was taken in mid-stream, where the Chicago River branches off north and south, at a depth of two feet below the surface. We then proceeded up the north branch of the Chicago River, taking a sample at Putnam and Robert's-streets—that is to say, at Erie-street-bridge—at one foot below the surface. The bridge at Fullerton-avenue being open, we passed through and proceeded half a mile above Fullerton-avenue (Map I.), where we took a sample at one foot below the surface. The next sample was taken immediately below Fullerton-avenue at one foot below the surface.

These collections terminated our expedition on the north branch of the river. We returned towards the spot where the river branches off north and south and then proceeded up the south branch. To gain time, and so as to complete all sample-taking before it became too dark, the captain deemed it advisable to proceed at once to the stock-yards and collect samples on our return journey.

It was a long trip up the south branch, and the bridges somewhat delayed us. However, about 1.30 P.M. we were able to collect a sample on the East Fork, close to the stock-yards, at two feet below the surface; another at two miles above the Pumping-works, south branch, one foot below the surface; another in the canal off Bridgport; another off A. canal; another abreast of Joliet Steel Works (one mile above Fuller-street); one at Fuller-street and Rost-street; one off Dupont's Slip; and, lastly, one opposite the Union depôt. All these samples were taken with the greatest possible care, and all observations about each one duly noted in the book forwarded to you.

We arrived at our landing-place opposite Dunham's (E 3), corner of Wells-street and the river—Dunham's being at the corner of South Water-street and Fifth-avenue (Wells-street is the continuation of Fifth-avenue on the north side). We disembarked here, it being more convenient for carrying off our samples. The wagon that conducted me to Dunham's in the morning met me, as agreed, at 3 P.M. and took the bottles back to my rooms, where I added a second label, so that no possible error could arise as to identification. After

carefully covering the stoppers with parchment I sealed them up and placed them in the cases.

As regards the remaining samples, No. 11 was taken at flat 9 of the Kenilworth, Thirty-sixth-street, and Ellis-avenue; No. 12 on the grounds of the World's Columbian Exposition; No. 13 at 134, West Madison-street; and No. 14 in the "saloon" of A. Kane on the north side of the city, on the west side of Rush-street-bridge, after crossing the latter. I have but to add that the sample taken in Jackson Park (World's Fair grounds) was collected from a tank in which the water was almost entirely frozen; that I have been unable to ascertain whether this will be a sample of the water to be supplied to visitors to the Exposition; and, finally, that I was told by a guard in the grounds that all the water in these tanks had been boiled.

LOG OF THE EXPEDITION.

Tug, *Bob Teed* Captain William Smith. Start out on Lake at 9 A.M. on Dec. 10th, 1892. Wind west, quite fresh all day.

Sample Bottle 1.—Taken at Putnam and Robert's Bridge (Erie-street). Depth, 1 ft.; air temperature, 25°; water temperature, 36°; current settling down from the north; tugs have been passing up and down the river and have caused the waters to move a little; west wind, blowing a little; no odour; the water looks brackish; the weather is clear now and fine.

Sample Bottle 2.—Taken where Chicago River branches off north and south, midstream. Depth, 2 ft. below surface; air temperature, 24°; water temperature, 37°; no current; no movement whatever in water worth mentioning; all surrounding boats at a standstill; west wind, little breeze; no odour; weather fine and sun now coming out; time, 10.45 A.M.

Sample Bottle 3.—Taken between Wabash- and Rush-streets on river, 2 ft. below surface Air temperature, 23°; water temperature, 33°; no current; the water looked pretty dirty; there were boats on either side of us, but there was no movement on the water except the little we made; we were at a standstill before taking sample; no wind, little breeze from westward; no odour.

Sample Bottle 4.—Taken at Union Depôt. Depth, 3 ft. below surface; air temperature, 22°; water temperature, 33°; no current; boats passing up and down the river, but none for two minutes before we operated; west wind; no odour: water very dirty.

Sample Bottle 5.—Taken at Dupont's Slip, 1 ft. below surface. Air temperature, 23°; water temperature, 33°; no current; dirty looking water; west wind; odour from lumber, which is strewn in great quantities just above this district; disturbance from tugs in the neighbourhood; time, 2.20 P.M.

Sample Bottle 6.—Taken at Fuller- and Rost-streets, 1 ft. below surface. Air temperature, 22°; water temperature, 40°; no movement in water; west wind; odour not so bad as at stock yards, but still strong; no boats have been moving for some time except our own; wind but slight.

Sample Bottle 7.—Taken off A Canal, 1 ft. below surface; air temperature, 26°; water temperature, 38°; current settling from west to east, at rate of half-mile; west wind; no odour; no movement in water, which is dirty looking.

Sample Bottle 8.—Taken abreast of Joliet Steel Works, one mile above Fuller-street, at 1 ft. below surface. Air temperature, 23°; water temperature, 36°; wind slightly to west; dreadful stench, impossible to describe; water quiet, but looks horribly dirty.

Sample Bottle 9.—Taken two miles off Court-house, 6 ft. below surface. Air temperature, 26°; water temperature, 33°; very little current coming from north-west; no boats near; wind W.N.W.; no disturbance, tug having previously been brought to a standstill.

Sample Bottle 9a.—Taken two miles off Court-house, at the surface. Air temperature, 26°; water temperature, 34°; west wind, driving water from river to lake; otherwise same as No. 9.

Sample Bottle 10.—Taken four miles off Court-house, 6 ft. below surface. Air temperature, 21°; water temperature, 34°; some current from north-west; wind N. by W.; no odour; no boats near; our tug at a standstill.

Sample Bottle 10a.—Taken four miles off Court-house, at surface. Air temperature, 21°; water temperature, 34°; some current from north-west; wind N.W. by W.; no odour; water looks very dirty; no boats near; our tug at a standstill.

Sample Bottle 11.—Taken at Thirty-sixth-street and Ellis-avenue, the Kenilworth Flats (Flat 9). Sample of drinking water supplied to the south side residences of Chicago; Dec. 9th, 1892.

Sample Bottle 12.—Taken in World's Fair grounds. This was a sample of drinking water (sterilised by being boiled) that had been placed in tanks in various parts of the World's Fair grounds, and was taken on Dec. 12th, 1892.

Sample Bottle 13.—Taken at 134, West Madison-street by Mr. Brown. This was a sample of drinking water as supplied by the city to the west side residents, and was taken on Dec. 12th, 1892.

Sample Bottle 14.—On north side, in the "saloon" of A. Kane, situated just over Rush-street Bridge, on the west side of the street; taken on Dec. 12th, 1892.

Sample Bottle 17.—Taken just below Fullerton-avenue, 1 ft. below the surface. Air temperature, 24°; water temperature, 34°; no current; pumping works close by; no wind—a little W.; some smell from the water itself, but almost imperceptible; boats about at present; the water is still.

Sample Bottle 18.—Taken one mile and a half above Fullerton-avenue on the north branch of the river at 1 ft. below the surface. Air temperature, 24°; water temperature, 34°; no current; no boats about; water quiet; no wind, only a little W.; smell from neighbouring brewery (Bran's); change made, bridge being opened, went through to save time.

Sample Bottle 19.—Taken two miles above Fuller-street pumping works at 1 ft. below surface. Air temperature, 28°; water temperature, 48°; no current; water black; no movement around; west wind; smell from stock yard nauseating.

Sample Bottle 20.—Taken at East Fork, close to stock yards, at 2 ft. below the surface. Air temperature, 22°; water temperature, 44°; no current; water black and disgusting; west wind; vile odour, stench insupportable from stock yards; no disturbance in water.

Sample Bottle 21.—Taken on Canal off Bridgport at 3 ft. below the surface. Air temperature, 21°; water temperature, 39°; no current; water dirty looking; west wind, stronger; no odour; no movement except that of our tug.

Sample Bottle 22.—Taken on dumping grounds, five miles out, at a depth of 12 ft. Air temperature, 24°; water temperature, 35°; surroundings looking very clear; wind, W.N.W.; no odour; the tug was brought to a perfect standstill before taking samples.

Sample Bottle 23.—Taken on dumping grounds, five miles off Court-house, at the surface. Air temperature, 13°; water temperature, 33°; wind, W.N.W.; no odour; no boats near; weather clear and cold; tug at an absolute standstill.